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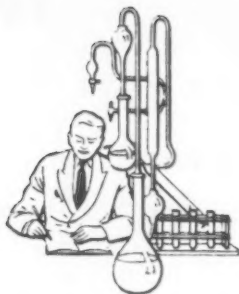
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Rule by Whim and Wham!

"NO BUSINESS in this country is immune from seizure," says Attorney General Biddle, defending the New Deal's taking over of Montgomery Ward. Also, adds this eminent administration law twister: "Our courts should bow to the will of the President." The latter statement seems somewhat gratuitous considering the judicial hand picking and hand packing that have taken place in the last ten years.

Mr. Biddle is hired to interpret the law and he certainly does a job that should please the boss. Whether or not it suits the little fellows who wear the barrels and who pay his salary through taxes is another question that will be determined, indirectly, on election day.

When Sewell Avery was carried out of his office by steel helmeted storm troopers, something much more important went out of the door with them. Out of that door at the same time went the Bill of Rights and the Constitution of the United States, and through it, replacing them, stalked dictatorship. Dictatorship wearing the disguise of an attempt to protect and forward the war effort but actually a scurrilous and obsequious move to curry favor with and gain votes from a labor union which apparently has long had its headquarters in the White House.

There was no question in this case of damage to war production, for Montgomery Ward are distributors and except for size, exactly like the general stores that you find throughout this country. And this company was continuing to do its normal business of distribution despite the fact that the New Deal, following its accepted practice of pressure had applied the thumb screws of restricted postal service. The company merely insisted upon the American right of knowing with whom it was to do business before it signed a contract.

If Master Biddle's opinion becomes crystallized into precedent then these United States of ours are no longer governed by law and order but are to be ruled by whim and wham. And every proprietor or manager of any enterprise whatever, from the largest corporation to the smallest store or farm, will have good reason to listen for and to dread the approaching footsteps of a new and un-American Gestapo with the power to accuse, to try, to condemn and to execute.

One hundred and sixty-nine years ago, Americans at the historic Boston Tea Party rejected the dogma that "the king can do no wrong." They thought and we did too that they had scotched this snake, but serpents have a way of coming to life again and this one is now showing its fangs once more.

Our forefathers then had no Congress to represent and protect them. We have, and it is about all of the protection that remains for liberty in this country. It is now time for Congress to act for the safety of our people and the safeguarding of the liberty for which our sons and brothers are dying.

John H. Edwards



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NEWS FRONT

► A major reason for the oversupply of field guns has been the improvements in metallurgy made since output started. In one case, the Bofors, the gun barrel is lasting about four times what was anticipated.

► One large Detroit auto maker has offered to buy certain DPC machines in its plant, making a concrete price offer to the government on the basis of delivery when the war is over. Washington turned the offer down, on the basis that there is no authority at this time to sell the machines.

► Auto makers are on the horns of a dilemma regarding new machine tool ordering. It is felt that high speed milling and other new techniques will likely come in, but opinion is that the developments are in a transition stage now. For this reason there is hesitation in ordering for fear the ideas may be immature.

► There is no unanimity in the auto industry on postwar market prospects. Some companies feel that higher prices will reduce the market, and that a 50 per cent increase in output, as anticipated by General Motors, Packard and Nash among others, may come but certainly does not have to be accompanied by increases in plant facilities.

It is pointed out that in peak production periods the auto industry produced at a rate of 6,000,000 cars annually without any of the expansion facilities now contemplated.

► A Detroit company is making a refrigerator for holding blood plasma for air shipment, which measures 3 ft. high by 2 sq. ft., and weighs 25 lb. with compressing machinery. Material is duralumin, in two light gage sheets with a spongy-texture insulating plastic sandwiched between. High cost excludes the item as a postwar refrigerator competitor.

► Despite harrowing experiences in the field of government controls, much of the automotive industry opinion concedes that retooling will require some overall pattern governing the placement of orders. Unless this is done, no one automobile builder is likely to secure tools necessary to rebuild his line.

► Profit margin of automotive companies on total sales has been cut in half in the past four years, George Romney, managing director of the Automotive Council for War Production points out.

► England plans to house its thousands of bombed-out families in prefabricated homes. Three to five tons of steel may be required in each house and liberal use of aluminum will be made.

► The Strandlund method of quenching armor plate has won for its developer, Carl G. Strandlund, of Chicago Vitreous Enamel Product Co., Cicero, Ill., the Chicago Tribune's War Workers Award.

Armor plate slabs are heated in the regular way, then carried from the annealing furnaces on transfer cars to a large press for quenching. Special dies were designed for this press containing 7200 holes through which water is ejected. The 2500 tons of pressure exerted by the press prevents distortion.

War goods contractors have been warned that they will be subject to greater scrutiny by renegotiation boards than prevailed during the past year.

► Brewster Bermuda dive bombers delivered to the British are now being converted for target towing duties.

► American Douglas Bostons are now being used for the laying of smoke screens in England. This arrangement will likely find frequent use in opening the second front.

► Germany has resorted to intensive salvage of downed Allied aircraft to help offset shattered industrial production. The principal item attracting German salvagers is ball bearings, resulting from attacks on Schweinfurt where more than half Germany's ball and roller bearings were made and the attack on the Erkner works, near Berlin.

Statistical Methods of Quality Control

TOLERANCES are maintained only by adequate gaging and inspection. These have been developed by industry, but recently further advances were made by the use of statistical data to compare present and past production as a guide to improved future production. This technique usually is referred to as "quality control."

Walter A. Shewhart started this new development in the early 1920's at Bell Telephone Laboratories. He felt the need for data in statistical record form to determine the efficiency of manufacturing methods of processess.

His book* published in 1931 explained the results of his efforts. Wide application of the procedure by various companies in different industries gave definite proof of its

*"The Economic Control of Manufactured Product," D. Van Nostrand Co., Inc., New York.

practical value. Shewhart based his theory on the mathematical laws governing probability and chance, the same laws known to and heeded by most professional gamblers.

Briefly—modern mass production forced industry to determine at all times whether or not manufactured parts fell within certain tolerances. Shewhart concluded that, aside from possible variations in all industrial processes, accurately compiled data plotted on a control chart would show variations falling within certain limits during most of any production run. These necessarily would be due to probability or chance. Variations falling outside set limits would be due to an assignable cause which could be corrected by prompt action.

Furthermore, by such data accurately compiled and graphically charted, one could predict with certainty exactly what portion of a production run of parts would fall within specified limit lines on a control chart. It worked.

The method can be adapted by any manufacturer to identify and eliminate from repetitive processes the causes of most rejections. By use of a control chart quality variations in

By **CRAIG STIREWALT**

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and

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o o o

manufactured articles can be reduced. Where there is 100 per cent inspection and accurate statistical data, the results of continuous inspection can be displayed in graphic form to picture an overall quality history at a glance.

To obtain an unending stream of mass-produced parts, all interchangeable, by automatic or semi-automatic machines make it essential for the manufacturer to:

- A. Have such machines correctly set up and adjusted at the start of each production run, and
- B. Have the output of each machine checked periodically during every run to insure maintenance of quality.

Benefits of Quality Control

Proper quality control procedure as outlined here will materially assist

in both the above tasks, and in addition, will definitely:

- A. Reduce rejections
- B. Predict impending trouble
- C. Lower inspection costs
- D. Narrow ranges of tolerance
- E. Provide a sound basis for the changing of specifications
- F. Point out faulty machines or processes.

When setting up a quality control system, there must be taken into consideration certain items found in all plants.

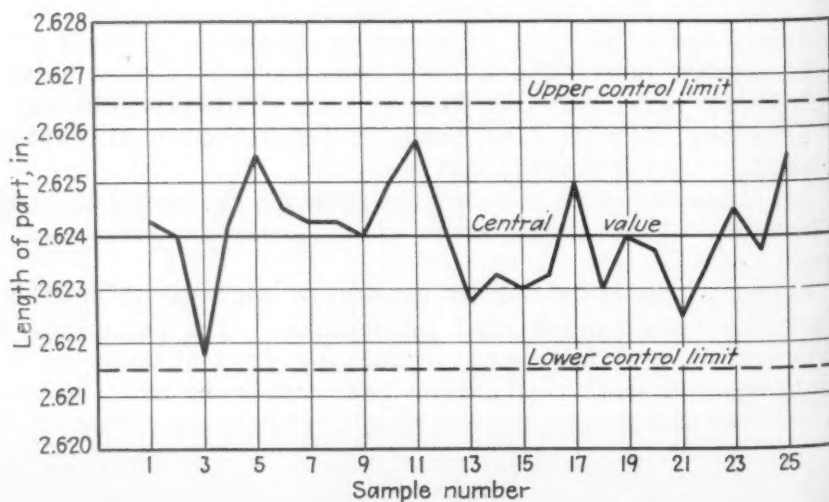
Consider first the amount of inspection required for a given product. This usually depends on:

1. What quality level is guaranteed to the consumer of the product.
2. What quality (if any) is inherent in the process.
3. What is the economic usefulness of the product?

Second, where sampling is done, the samples must be carefully analyzed to give an accurate indication of the quality of the product which was not inspected. Accurate prediction of product quality by sampling can be done only if test results from successive samples show quality is "controlled."

Third, when preparing or using

FIG. 1—Average length measurements of bushings produced on a screw machine are plotted on this control chart from hourly samplings. The data are recorded in Table I.



y Control

manufacturing statistics for purposes of quality control, it must be borne in mind that small samplings are insufficient evidence upon which to judge a large lot, hence supplementary knowledge is necessary. Such required additional data are readily available in the form of hindsight predicated on past performance records.

Assuming then that successive lots will be essentially alike, it becomes necessary to analyze a single large sampling or a long consecutive run of individual samples to determine what the present quality level actually is. This same analysis usually will indicate what changes have or should have taken place in that level.

It should be noted that variations within established control limits are not signals of poor production. Instead, variations *beyond* the control limits are the indicators of a need for immediate remedial action.

Most humans look for trouble that doesn't exist, or overlook troubles actually present. Hence, limits must be set up which are narrow enough to disclose quickly the troubles needing correction, yet broad enough to keep us from continually seeking non-existent troubles.

Properly set control limits establish a median of data noted. They

... Examples of size variations occurring in simple screw machine products are charted to interpret the principles of the statistical method of controlling quality during manufacture, first developed by Walter A. Shewhart of the Bell Telephone Laboratories. Shunning mathematical formulas, the authors concentrate on the interpretation of data plotted graphically.

give voice to the control chart which daily will answer correctly the ever-present question, "How can we better our production?" by replying, "Investigate these phases of production."

A thorough preliminary study of all production processes and methods in the plant is absolutely essential to a successful application of control chart techniques. Its advantages must be wholly clear and completely sold to top management before installation. Once started, full and detailed data must be recorded daily.

In order to clarify and sell to top management the benefits to be gained by a quality control system, let us examine the two basic reasons for maintaining inspection records and graphic control charts. These are:

- A. To reveal points of possible improvement in articles on hand, and
- B. To disclose improvement possibilities in methods or

processes on future production runs.

These purposes tie in strongly with profits or losses so there are genuine economies to be had. These in turn reduce losses while augmenting profits.

Use of Control Charts

Control charts commonly used today are each based on the kind of inspection data recorded, as follows:

Chart No. 1 records by actual measurement the individual characteristics of the article or specimen examined.

Chart No. 2 records the number of articles or specimens inspected, the quantity accepted and the number defective.

Chart No. 3 records the number of observable defects in a sample when the possible number of defects may be rather large, and compares the observed with the average number of defects per sample.

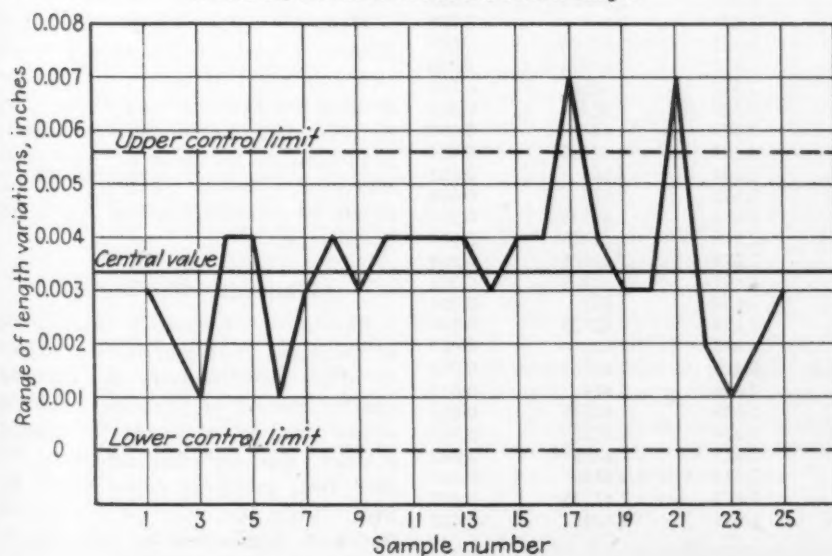
Control chart data may be obtained by inspection sampling in either of two ways:

- A. Sampling by Variables, which is inspection by actual measurement, or
- B. Sampling by Attributes, which is inspection noting only the presence or absence of one or more characteristics.

The statistical methods outlined are not offered as substitutes for common sense nor to replace processing skills. Proper use of these methods will provide additional useful tools which materially assist processing skills and good judgment as demonstrated by the examples below:

Problem: To maintain uniform excellent quality production on an automatic screw machine turning out a

FIG. 2—Range of length variations plotted from data in Table 1. Two points, samples 17 and 21, are shown out of the control range.



part whose tolerance on length is 2.625 ± 0.005 in.

Samplings of four pieces were measured for length every hour. The results are recorded in Table I and charted in Fig. 1.

Notice the variations between individual pieces and between hourly groups. For example, the average on test No. 1 was 2.62425 in. but test No. 2 averaged 2.624 in. while test No. 3 average was 2.62175 in. Likewise there was a diversity in range of measurements within successive samplings.

The variations present the question: "Are they due to chance or to an assignable cause?" The basic purpose of quality control analysis is to answer that question.

Quality control analysis is made by comparing the variations of samples within each group and between the groups. Based on the laws of chance and probability, these hourly measurements over a period of time will show definite trends which point the way to corrective steps.

The hourly test averages are first plotted on a control chart chronologically as shown in Fig. 1. Observe that samples are in order along the horizontal axis with averages plotted on the corresponding verticals.

Use of Control Limits

Now, by plotting on the chart control limits based on "Control Chart Practices" as set forth in the bulletin "American War Standard Z-1.3" prepared by American Standards

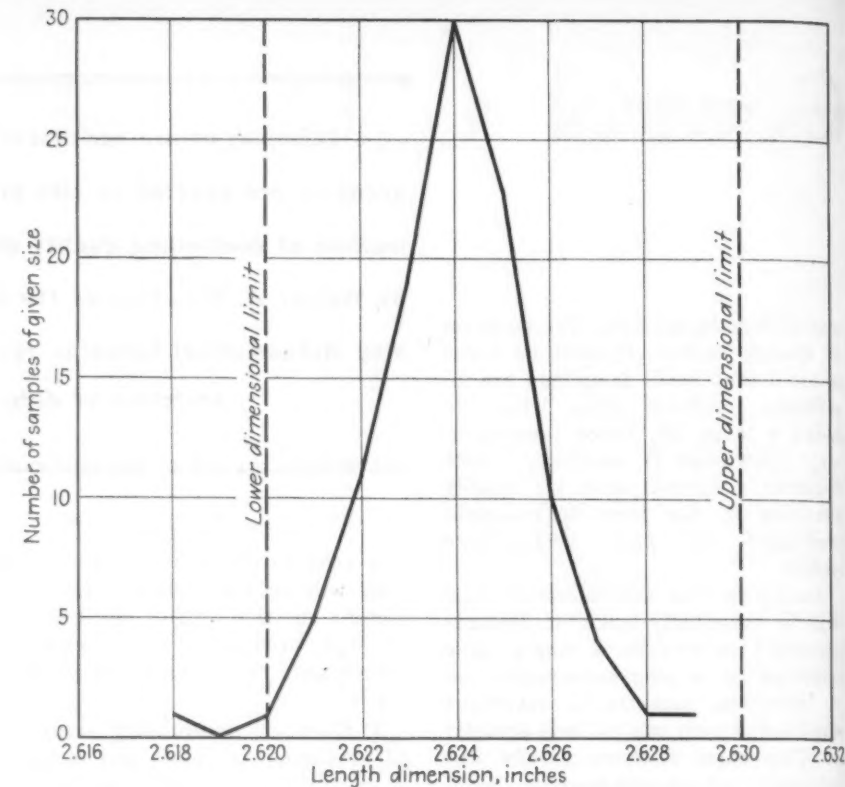


FIG. 3—A frequency distribution chart shows groupings of samples by actual dimensions. For instance 28 samples out of 100 measured 2.624 in. in length.

Association, New York, it is comparatively simple to decide whether measurements recorded over the 25 hour period vary through chance or from an assignable cause.

The plotted control limits are symmetrical above the average dimension for all samples, namely 2.62397

in., which is used as a central value because it is desired to know if the samples tested show control with respect to one another, that is, were taken from a uniform batch of parts. If such control is shown, only a change in machine set-up is necessary to increase the average dimension, for example, from 2.62397 to 2.625 in.

In the example chosen, the upper control limit was fixed at 2.6264 in. and the lower at 2.6215 in. Reference to the chart and tabulation shows all sample averages fall within these limits, indicating that the process is definitely under statistical control.

However, the range variations plotted graphically in Fig. 2 reveal two points out of control. They may or may not indicate trouble, but they do point out the immediate necessity to investigate the cause of these range increases. Should trouble be found, it can be remedied before continuing operations.

Frequency Distribution

Plotting of frequency distribution of measured characteristics of a part is often advantageous in studying quality control of processes. Such a record can be prepared by placing a mark opposite each dimension for each test, grouping these marks by fives. When the count of frequencies for each dimension is complete, a

TABLE I Hourly Sampling of Length Measurements on a Screw Machine Part						
Test No.	Sample A	Sample B	Sample C	Sample D	Average	Range
1	2.624	2.626	2.624	2.623	2.62425	0.003
2	2.625	2.623	2.624	2.624	2.624	0.002
3	2.622	2.621	2.622	2.622	2.62175	0.001
4	2.624	2.626	2.622	2.625	2.62425	0.004
5	2.623	2.627	2.624	2.627	2.6255	0.004
6	2.625	2.624	2.625	2.624	2.6245	0.001
7	2.623	2.624	2.626	2.624	2.62425	0.003
8	2.626	2.624	2.625	2.622	2.62425	0.004
9	2.623	2.624	2.626	2.623	2.624	0.003
10	2.625	2.623	2.627	2.625	2.625	0.004
11	2.628	2.624	2.625	2.626	2.62575	0.004
12	2.622	2.626	2.624	2.625	2.62425	0.004
13	2.620	2.623	2.624	2.624	2.62275	0.004
14	2.623	2.625	2.623	2.622	2.62325	0.003
15	2.624	2.622	2.621	2.625	2.623	0.004
16	2.623	2.621	2.625	2.624	2.62325	0.004
17	2.624	2.629	2.622	2.625	2.625	0.007
18	2.621	2.622	2.624	2.625	2.623	0.004
19	2.623	2.624	2.623	2.626	2.624	0.003
20	2.622	2.624	2.625	2.624	2.62375	0.003
21	2.623	2.625	2.618	2.624	2.6225	0.007
22	2.623	2.625	2.623	2.623	2.6235	0.002
23	2.625	2.624	2.625	2.624	2.6245	0.001
24	2.625	2.624	2.623	2.623	2.62375	0.002
25	2.627	2.626	2.624	2.625	2.6255	0.003

graphic indication is available of the spread of the tests through the tolerance range. As an example, the data shown in Table I can be arranged as follows, according to length:

Length Dimen- sion, In.	Fre- quency
2.618	1
2.619	0
2.620	1
2.621	4
2.622	11
2.623	19
2.624	28
2.625	21
2.626	9
2.627	4
2.628	1
2.629	1

This tabulation shows most pieces measured 2.624 in. which also was nearly the average of all the tests. Few samplings were far from this central length, with the majority producing a normal curve of distribution, Fig. 3.

The specified tolerance was 2.625 \pm 0.005 in. giving a permissible range from 2.620 to 2.630 in. All but one test (2.618 in.) came within these tolerances and would have been accepted. Thus the number defective was one in 100, or 1 per cent faulty. Frequency distribution shown as a curve usually illustrates variances of measure within given tolerances far more vividly than a tabulation of frequency counts.

Since chance causes can and do produce variations in quality in most manufacturing processes, the quality control engineer must acknowledge all such variants when setting up control limits. Extreme care at that stage results in a minimum of rejections, in turn materially reducing field and assembly complaints. All this tends to augment profits and decrease costs.

Another Example

"Go" and "Not Go" inspection to decide whether individual product units meet engineering tolerances is another example of the value of statistical methods to control manufacturing quality. In fact, the results of such inspection is best analyzed by control chart techniques, using the following steps:

1. Tabulate for a reasonable time the number of product units inspected each hour, shift or day, the number rejected during like periods and the present percentage of defective units per period.
2. Plot changes in percentage of defective parts from hour

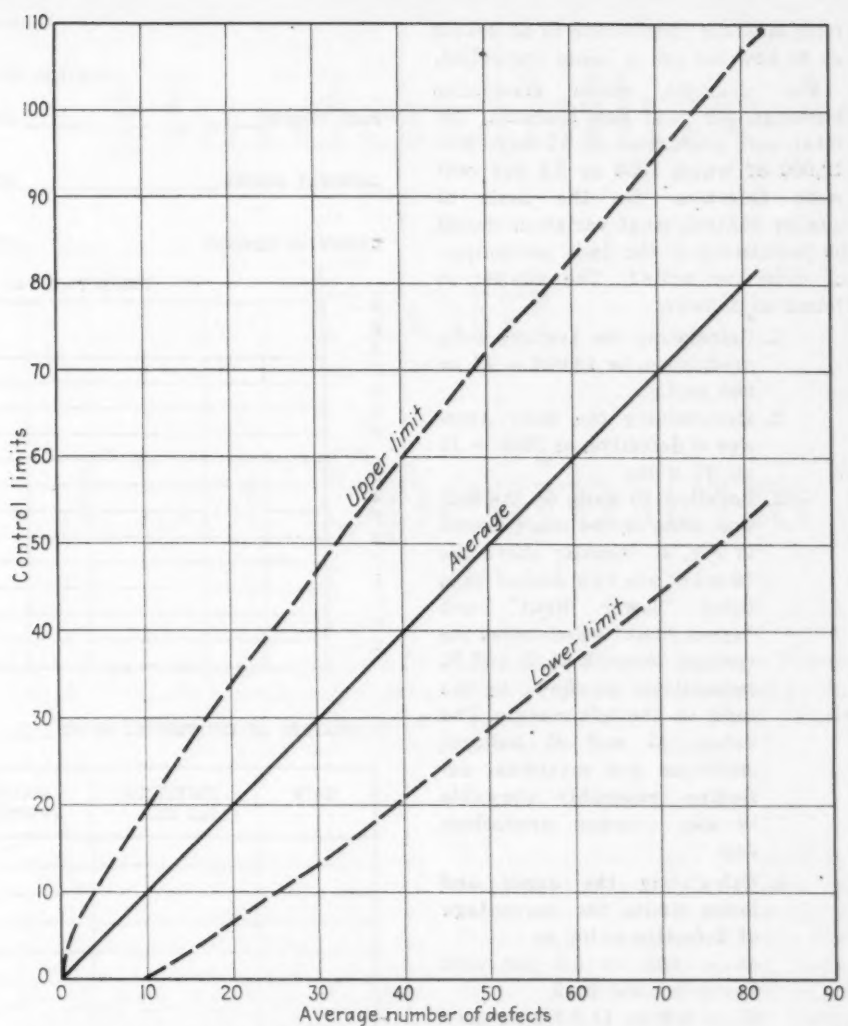


Fig. 4—Control chart for number of defects on cowl flap bushings.

This chart is an example of Poisson's Distribution. Statistically, the lower and upper control limits shown are based on the fact that the probability is 0.005 that not more than *Y* defects will be observed in a single sample and that the probability is 0.995 that less than *X* defects will be observed under like conditions. Poisson's Distribution is used when determining whether or not the quality of a given part is as good as can be expected under the manufacturing processes by which that part is being made. It is presupposed that no definite correctable cause is affecting the quality of the finished article and that variations in random samples are due to chance.

By this method any part having *C* possible defects can be analyzed. First, the average number of defects per article must be determined. The result is designated as *c'* and is obtained by periodically sampling one in every *n* articles. The authors found the most accurate results came from sampling only out of lots of 30 or less at intervals of a fixed duration. Divide the total number of defects in all samples by the number of samples taken and the answer is *c'*.

Going to the chart, find *c'* on the horizontal axis and trace up the vertical axis of *c'* to its intersection with the lower control limit. Read that limit on the horizontal axis at point of intersection. Follow on up the vertical axis of *c'* to its point of intersection with the upper control limit and read that limit on the horizontal axis.

This procedure gives the lower and upper range of control limits within which all samples of accepted quality must fall. Every variation outside the control limits should be investigated at once and an assignable cause found before resuming production.

o o o

to hour, or day to day in chronologic order on a control chart similar to the sample attached.

3. Decide from the established control limits if changes recurring from period to period in percentage of defective parts are due only to chance or to an assignable cause.

Results obtainable from and the method of carrying out the three suggested steps are explained by the fol-

lowing illustration applicable to any mass production job where inspection stations are placed at final and sub-assembly points and on selected important parts.

Units failing to meet specifications are rejected at the inspection stations, but merely sifting good units from bad isn't enough. The percentage of defective units at each inspection station is recorded and these data index the quality of production. Statistical analysis of the figures per-

For example, while machining bushings for cowl flap brackets, the total unit production in 15 days was 12,000 of which 1050 or 8.7 per cent were defective. On the basis of quality control, what variation should be permissible in the daily percentage of defective units? The answer is found as follows:

1. Calculating the average daily production, or $12,000 \div 15 = 800$ units
2. Determining the daily average of defective, or $1050 \div 15 = 70$ units
3. Locating 70 units on the bottom scale of the chart shown in Fig. 4. Directly above the 70-mark are two dashed lines titled "lower limit" and "upper limit" which cross the vertical 70-mark at 45 and 95 respectively as shown by the scale on the left margin. The values 45 and 95 indicate minimum and maximum defective reasonably allowable in any average production day.
4. Calculating the upper and lower limits for percentage of defective units, or
 $45 \div 800 = 5.6$ per cent Lower control limit
 $95 \div 800 = 11.9$ Upper control limit

Actual daily results on the bushing job appear below. Samples whose measurements fall outside the control limits are marked with an asterisk:

Day	Production	Number Defective	Per Cent Defective
1	796	50	6.2
2	810	54	6.6
3	805	51	6.3
4	802	55	6.8
5	796	48	6.0
6	798	42	5.2*
7	801	53	6.6
8	795	47	5.9
9	800	57	7.1
10	807	46	5.7
11	796	52	6.5
12	799	59	7.3
13	795	45	5.6
14	797	49	6.1
15	803	52	6.4

Control charts can and do indicate variations likely to occur when there

PART NUMBER	DATE* FROM	TO
1	1/1/68	1/1/69
2	1/1/69	1/1/70
3	1/1/70	1/1/71
4	1/1/71	1/1/72
5	1/1/72	1/1/73
6	1/1/73	1/1/74
7	1/1/74	1/1/75
8	1/1/75	1/1/76
9	1/1/76	1/1/77
10	1/1/77	1/1/78
11	1/1/78	1/1/79
12	1/1/79	1/1/80
13	1/1/80	1/1/81
14	1/1/81	1/1/82
15	1/1/82	1/1/83
16	1/1/83	1/1/84
17	1/1/84	1/1/85
18	1/1/85	1/1/86
19	1/1/86	1/1/87
20	1/1/87	1/1/88
21	1/1/88	1/1/89
22	1/1/89	1/1/90
23	1/1/90	1/1/91
24	1/1/91	1/1/92
25	1/1/92	1/1/93
26	1/1/93	1/1/94
27	1/1/94	1/1/95
28	1/1/95	1/1/96
29	1/1/96	1/1/97
30	1/1/97	1/1/98
31	1/1/98	1/1/99
32	1/1/99	1/1/00
33	1/1/00	1/1/01
34	1/1/01	1/1/02
35	1/1/02	1/1/03
36	1/1/03	1/1/04
37	1/1/04	1/1/05
38	1/1/05	1/1/06
39	1/1/06	1/1/07
40	1/1/07	1/1/08
41	1/1/08	1/1/09
42	1/1/09	1/1/10
43	1/1/10	1/1/11
44	1/1/11	1/1/12
45	1/1/12	1/1/13
46	1/1/13	1/1/14
47	1/1/14	1/1/15
48	1/1/15	1/1/16
49	1/1/16	1/1/17
50	1/1/17	1/1/18
51	1/1/18	1/1/19
52	1/1/19	1/1/20
53	1/1/20	1/1/21
54	1/1/21	1/1/22
55	1/1/22	1/1/23
56	1/1/23	1/1/24
57	1/1/24	1/1/25
58	1/1/25	1/1/26
59	1/1/26	1/1/27
60	1/1/27	1/1/28
61	1/1/28	1/1/29
62	1/1/29	1/1/30
63	1/1/30	1/1/31
64	1/1/31	1/1/32
65	1/1/32	1/1/33
66	1/1/33	1/1/34
67	1/1/34	1/1/35
68	1/1/35	1/1/36
69	1/1/36	1/1/37
70	1/1/37	1/1/38
71	1/1/38	1/1/39
72	1/1/39	1/1/40
73	1/1/40	1/1/41
74	1/1/41	1/1/42
75	1/1/42	1/1/43
76	1/1/43	1/1/44
77	1/1/44	1/1/45
78	1/1/45	1/1/46
79	1/1/46	1/1/47
80	1/1/47	1/1/48
81	1/1/48	1/1/49
82	1/1/49	1/1/50
83	1/1/50	1/1/51
84	1/1/51	1/1/52
85	1/1/52	1/1/53
86	1/1/53	1/1/54
87	1/1/54	1/1/55
88	1/1/55	1/1/56
89	1/1/56	1/1/57
90	1/1/57	1/1/58
91	1/1/58	1/1/59
92	1/1/59	1/1/60
93	1/1/60	1/1/61
94	1/1/61	1/1/62
95	1/1/62	1/1/63
96	1/1/63	1/1/64
97	1/1/64	1/1/65
98	1/1/65	1/1/66
99	1/1/66	1/1/67
100	1/1/67	1/1/68

ASSEMBLY NUMBER	
	QUALITY RATE

DIMENSION CHECKED _____ INSPECTOR _____

INSPECTION TAG NUMBERS

[illegible]

TOLERANCES ON ENGINEERING PRINT _____ CONTROL LIMITS

[illegible]

FIG. 5—On a control chart form such as this a record of inspection data as well as control limits can be maintained.

Calculating the control limits for per cent defective involves mathematics based on the laws of chance and probability, but actual application is simple because we can draw curves showing what the limits should be.

Curves shown in this article are calculated from basic formulae proved by many varied and actual applications. Detailed studies and illustrations of these formulae may be found in manuals such as Leslie E. Simon's "Statistical Methods."

A sample control chart form is attached. It provides on a single sheet a record of actual inspection data as well as control limits. By plotting daily the per cent defective in the corresponding space above the daily figures, a perpetual control can be established.

The authors will appreciate queries or comments from interested readers, and especially from those who try these suggestions under actual operating conditions.

Hardenability

From

Cast Specimens

By E. S. ROWLAND

Research Metallurgist, Steel and Tube
Division, Timken Roller Bearing Co.,
Canton

THE advent of hardenability as an additional means of maintaining uniformity and improving the control of production parts during the heat treating operations has led to an ever-growing demand for hardenability information on all heats of steel applied on a given part. This situation placed a serious burden on the steel mill because the accepted method of machining, normalizing and quenching hardenability tests from bars forged from blooms or billets was time consuming, cumbersome for large numbers of tests and expensive. The most important drawback, however, was that the hardenability data were obtained too late in the processing of the steel to apply the particular heat to a requirement other than the one for which it was originally intended. It was often found that if the heat had been rolled into another size it would have fit a different application perfectly.

Development of the cast hardenability technique, now used in practically all alloy steel mills, solved most of the problems and has proved to be a rapid, relatively inexpensive method of obtaining hardenability data of satisfactory accuracy at a very early stage of fabrication. The Jominy end-quench specimen is universally used because one size of test piece can be employed for all steels whereas the cylinder method requires different sizes for various ranges of hardenability with resultant scheduling problems.

The method in its simplest form consists in casting the test piece to size and shape, but of somewhat greater length, and with the integral collar just below the shrinkhead. The fins are ground off, the specimen cut to length on an abrasive saw, heated

... Type of equipment used and technique employed at the Timken plant for casting Jominy end-quench specimens are described by the author herein. Also presented are graphs showing typical results from cast and forged hardenability tests.

to the proper temperature and end-quenched. Two flats are machine ground to the proper depth 180 deg. apart and hardnesses taken along the flats on a fixture which permits proper spacing of the impressions. Several modifications of the above procedure are in use in different plants.

In the Timken mill, for example, it is preferred to cast the specimen to

the size of the collar diameter and machine the specimen to size and length since it produces a smooth surface and an accuracy of size more suited to the later operations. It does introduce, however, the additional operation of a 1200 deg. F. temper before machining but does not alter the final result. These refinements in the specimen repay in better

THE test piece is cast to size and shape, with integral collar just below the shrinkhead. Frequently, it has been found preferable to cast the specimen to the size of the collar diameter and machine the specimen to size. Details of the split mold used are shown in the photograph on page 65.



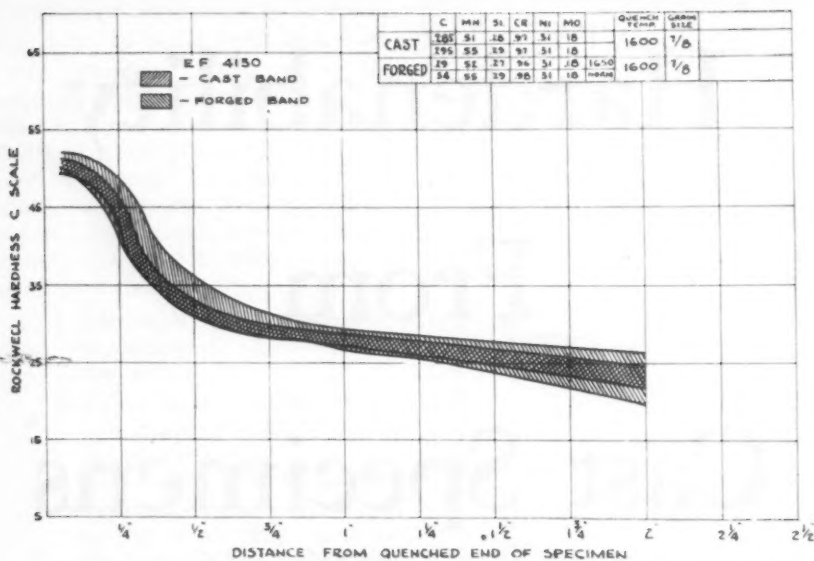


FIG. 1—These results show the excellent agreement between cast and forged values for 4130 steel. Three cast specimens were taken during the pouring of the first, middle and last ingots.

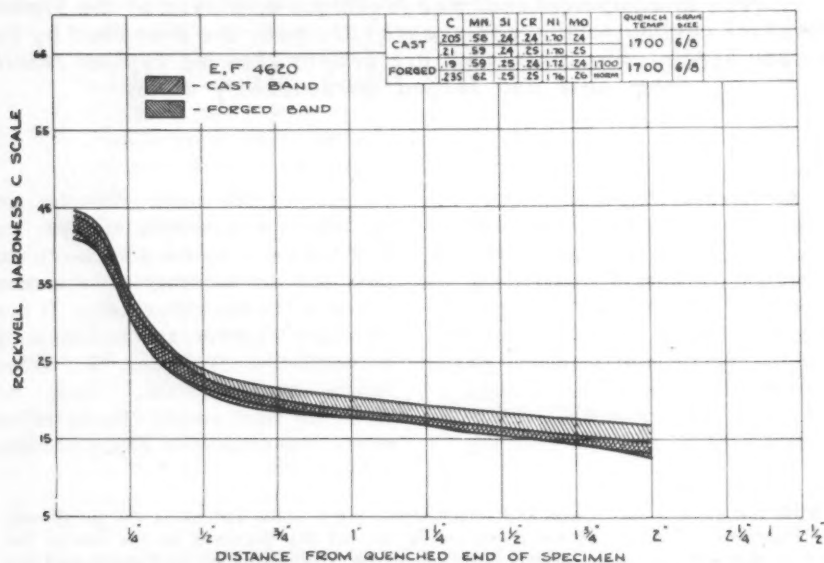


FIG. 2—Here again, the agreement is excellent between the cast and forged specimens for 4620 steel. Variation among forged specimens can be traced to chemical variation.

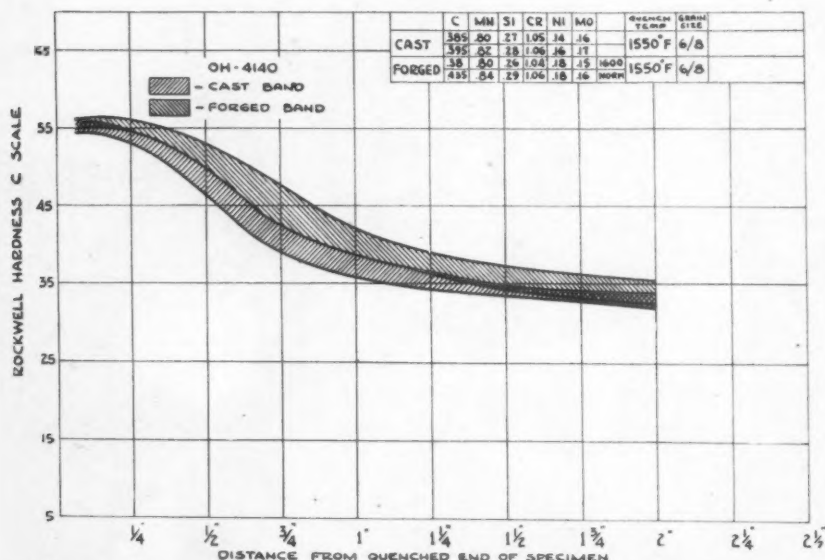


FIG. 3—The cast specimen band for this 4140 steel is just below that of the forged specimen. All cast tests were tempered at 1200 deg. for machining and the forged specimens were normalized.

control of the testing procedure and in some gain in ultimate accuracy.

The mold itself is at least as important as any other single factor in producing accurate test results. A split-type steel mold is used with a shrink-head cavity of sufficient size to produce a sound test piece free from voids in the test section. (See accompanying photographs.) The ratio of the weight of metal in the mold to the weight of the test specimen must be adjusted to produce the proper degree of chill. In this way the austenitic grain size of the casting can be made to conform to that of the forged and prior normalized specimen. A mold to test piece weight ratio of from 7:1 to 10:1 produces a satisfactory correlation. All normal testing precautions must be rigidly adhered to in performing cast hardenability tests in order to maintain a degree of accuracy commensurate with the requirements of the results.

Figs. 1 through 3 show typical results from cast and forged hardenability tests on single heats of 4130, 4620 and 4140 steels. Three cast tests were taken during the pouring of the first, middle and last ingots of each heat while seven forged specimens were prepared from the top and bottom of the first and last ingot product and from the top, middle and bottom of the product of the middle ingot. The cast tests were tempered at 1200 deg. F. for machining and the forged tests normalized. All specimens were analyzed and the total variation of the important elements for both cast and forged specimens, together with oxidation grain size values and the normalizing and quenching temperatures accompany the curves.

These results show excellent agreement between cast and forged values for 4130 and 4620 steels while the cast band for the 4140 heat is just below that of the forged. The greater variation among the forged specimens can be traced to a larger chemical variation, particularly carbon, and to the effects of gross heterogeneity induced by much slower freezing of the ingots. Fig. 4 shows the negligible effect of normalizing the cast specimen prior to quenching on 4337 and 8749 steels. Both the forged and normalized and the cast and normalized specimens were tempered after normalizing so that their prior structures would conform to that of the cast and tempered specimen. The divergence between the cast and forged results for this particular 4337 heat is as great as any encountered to date on any analysis and the results were included to show the magnitude of the maximum disagreement.

Of course, the major discrepancy occurs over a range of cooling rates at which the effect of small variations in the material is greatly magnified. Also, this analysis is normally subject to a considerable degree of gross heterogeneity (banding) when rolled or forged from ingots, a condition which raises the hardenability as measured by the end-quench tests when the normal hardenability criterion of depth to 50 Rockwell C is used.

Experience with the cast hardenability test and its correlation with tests run on bars rolled to their final size clearly shows that the agreement is of satisfactory accuracy for all practical purposes when applied to fine grained, hypoeutectoid alloy constructional steels. Among the steels which are not grain controlled in melting the correlation with forged or rolled, normalized specimens is generally satisfactory if the carbon content is low and the alloy content fairly high, such as in 3312, Krupp and other high alloy carburizing grades. Otherwise, agreement cannot be depended upon. In the case of hypereutectoid steels the exact conditions of the excess carbides are so important in determining the hardenability by defining both the grain size and the nucleating conditions in the austenite that satisfactory correlation between cast and rolled tests is uncertain.

Almost exact agreement results in those steels which are insensitive to the effect of small variations in prior structure on hardenability and which are not subject to serious banding in the rolled or forged state. Steels high in chromium and vanadium are quite sensitive to prior structure variation due to the slow rate of solution of these carbides in the austenite, while the high nickel, high alloy steels are most subject to banding. In these types (Figs. 3 and 4) the correlation is less exact but the cast test invariably has the lower hardenability, a fortunate condition since the user is generally more concerned with attaining a certain minimum hardenability value than in operating below a certain maximum. The cast test has the further advantage of integrating the chemical segregation normally existing from top to bottom of the ingot and thus presenting a better average result than a random rolled test from the ingot product. The present practice of pouring cast tests from near the front and back of the heat and averaging the data obtained serves to encompass all the chemical variation through the heat.

The calculation of hardenability

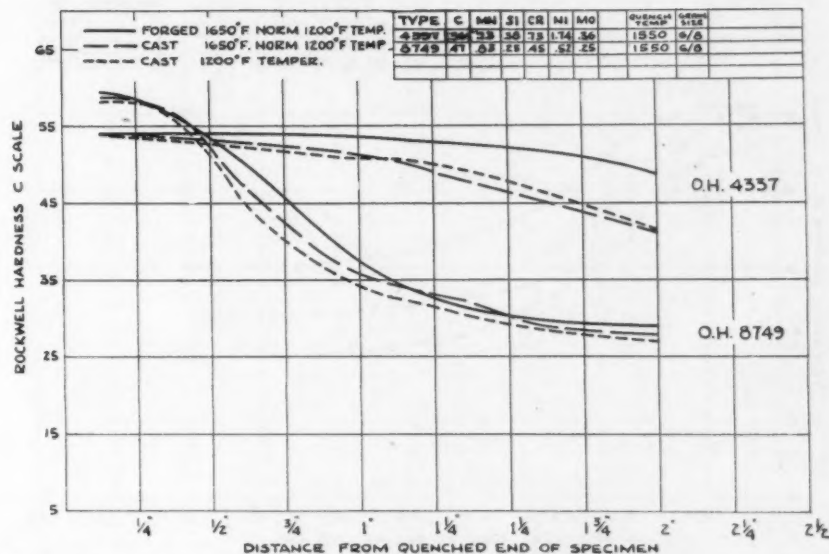


FIG. 4—These data show the negligible effect of normalizing the cast specimen prior to quenching, for 4337 and 8749 steels.

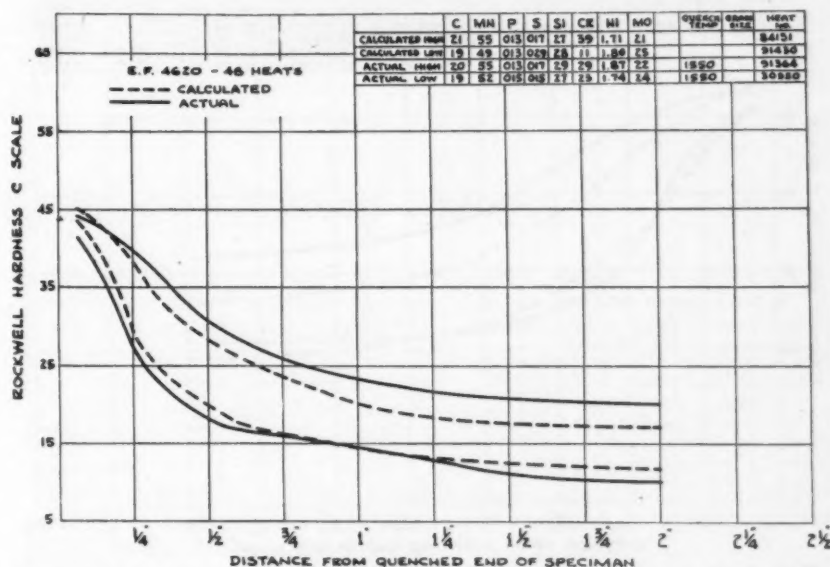


FIG. 5—Comparison between calculated and cast hardenability values for 48 heats of E.F. 4620 steel.

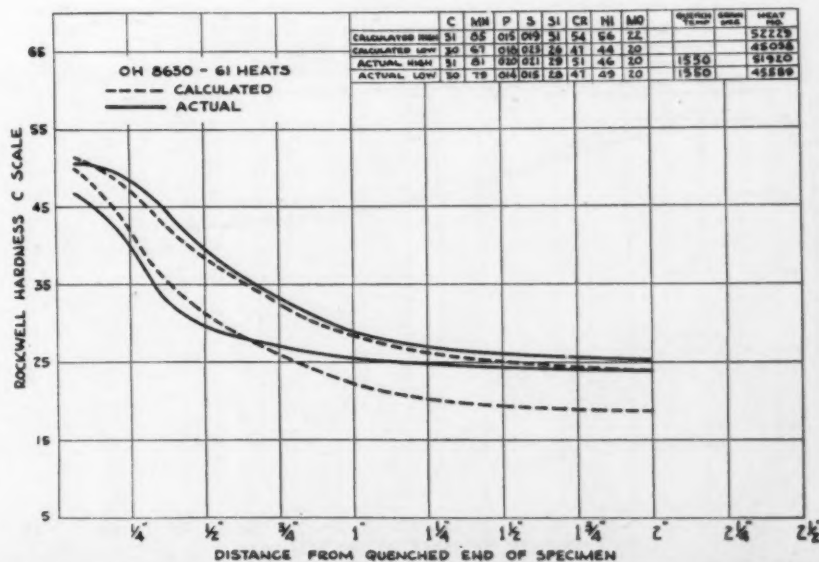


FIG. 6—Comparison between calculated and cast hardenability values for 61 heats of O.H. 8630 steel.

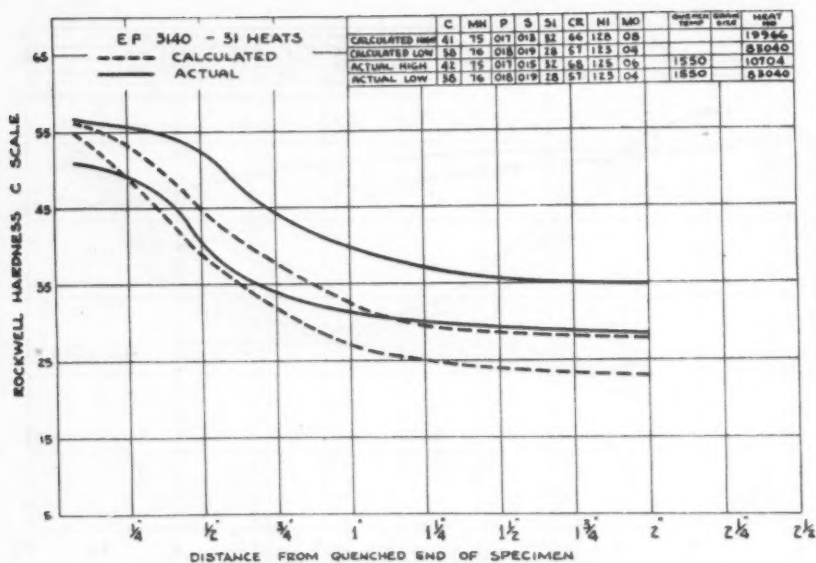


FIG. 7—Comparison between calculated and cast hardenability values for 31 heats of E.F. 3140 steel.

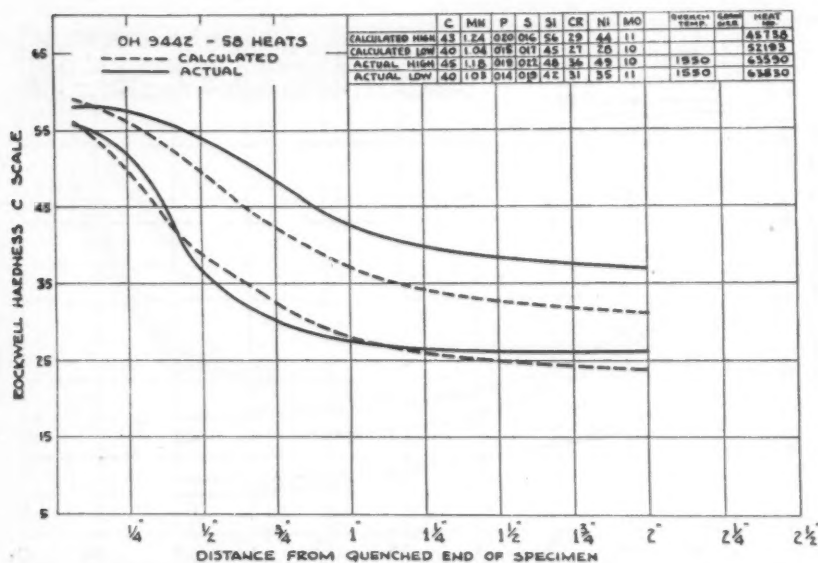


FIG. 8—Comparison between calculated and cast hardenability values for 58 heats of O.H. 9442 steel.

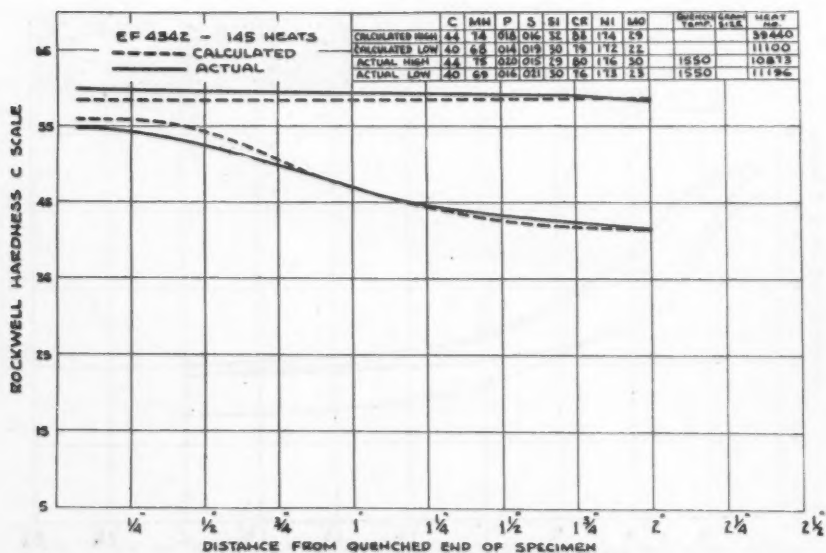


FIG. 9—Comparison between calculated and cast hardenability values for 145 heats of E. F. 4342 steel.

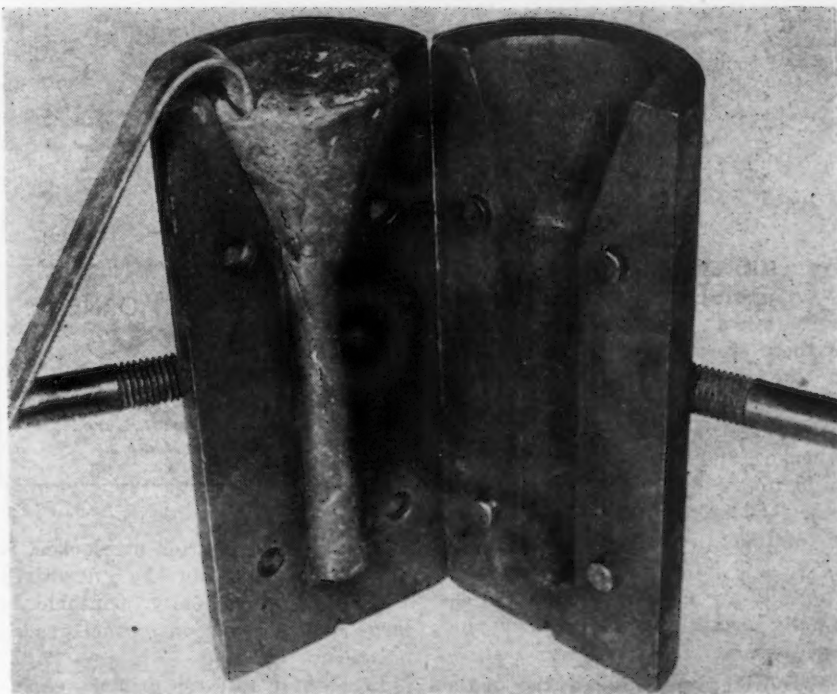
curves is being widely used to obtain an approximate value of the hardenability of a heat from a knowledge of the chemistry and grain size alone. This method has an evident advantage in that the hardenability can be calculated before the heat is tapped (assuming a grain size value) and the analysis adjusted in the furnace, if necessary. The extent of the agreement between calculated and cast hardenability values may be judged in Figs. 5 through 9 for a large number of heats of 4620, 8630, 3140, 9442 and 4342 types, respectively.

In each figure the solid lines represent the hardenability curves of the high and low heat of the group as determined by cast tests quenched from the temperature indicated in the legend. The dotted lines represent the hardenability curves of the heats having the highest and lowest ideal critical diameter as calculated by the method devised by Grossmann (Trans. AIME, 1942, Vol. 150, P. 227) assuming a grain size value of 8. The multiplying factors for the elements actually used were those compiled by the American Iron & Steel Institute which differ only slightly from Grossmann's original values. These calculated ideal critical diameter results were transposed to end-quench curves by the method of Field (Metal Progress, 1943, Vol. 43, P. 402). The analyses of the high and low heats by both cast test and calculated methods are shown in the legend together with their heat numbers to indicate that the high and low heats by both methods are not generally the same.

Inspection of these curves indicates that the agreement between cast and calculated hardenability results is satisfactory for the 4620, 8630 and 4342 types but not nearly as satisfactory for the 3140 and 9442 types. Correlation between cast and calculated curves for individual heats is no better and, in general, poorer than the agreement for the group as a whole. The bands shown in Figs. 5 through 9 are typical of those determined for other types and illustrate the uncertainties accompanying dependence upon calculated values alone. They do provide, however, a reasonable first approximation of hardenability which will probably improve as the quantitative effects of the alloying elements are better understood, particularly at the higher percentages.

For the present and immediate future it is believed that the cast test represents the average hardenability of the heat of steel in rolled or forged form with entirely satisfactory accuracy for all practical purposes of ap-

THIS split-type steel mold is used with a shrinkhead cavity of sufficient size to produce a sound test piece free from voids in the test section. The ratio of the weight of metal in the mold to the weight of the test specimen must be adjusted to produce the proper degree of chill. A ratio of 7:1 to 10:1 produces a satisfactory correlation.



plication. Certainly, the effects of time at quenching temperature and prior structure variations commonly existing between the hardenability test piece and the production part produce far greater differences in hardenability in many types of steel than the difference between the cast and forged hardenability test result.

Sawing Babbitt Bearing Linings

A POWER driven saw designed and built at General Electric's Pittsfield works simplifies the operation of cutting the babbitt in bearing linings for large motors. The cut is made from the inside after the babbitt has been cast into the bearing casting, separating it into halves.

A trunnion cradle, Fig. 1, holds the bearing in place for the cut and the bearing is rotated until one of the slits

for dividing it in two is lined up with the saw by means of a bar guide, seen in Fig. 2. The work cradle is mounted on slides, enabling the operator to feed the bearing into the saw by means of a handwheel. The saw is driven by a 1-hp. motor through a gear drive.

The saw is supported on a swing arm with a gage which allows it to cut to the desired depth, thereby just

cutting through the babbitt and not into the bearing housing itself. After the first cut is made, the piece is revolved and the operation is repeated.

Substantial reduction in the time required for the operation results from the fact that the clamping mechanism for holding the bearing is quickly applied, and the rotation of the bearing is made easily without the use of a crane.

FIG. 1—Details of trunnion fixture used to support heavy bearing castings while the babbitt lining is slit. C-clamp is shown swung out of the way.

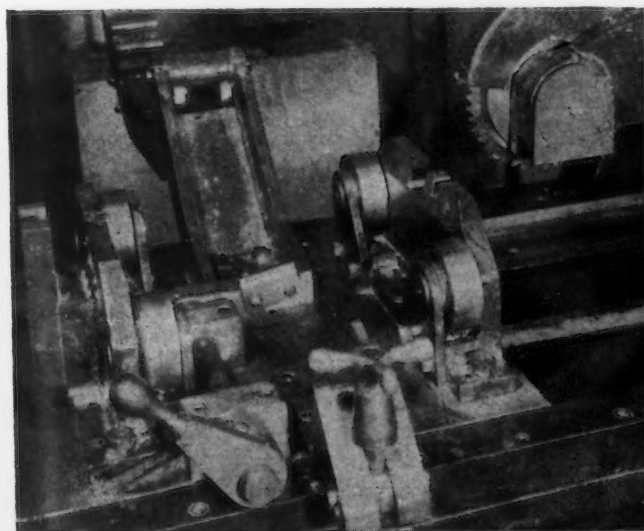
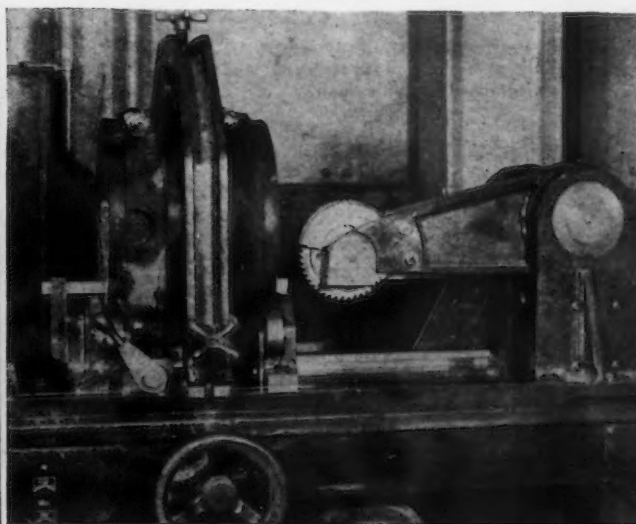


FIG. 2—Bearing clamped in fixture ready to be fed into saw by handwheel. Bar guide for lining up split in casting may be seen in place.



An Inexpensive Photometer

THERE are commercial metallurgical microscopes incorporating a photometer, and some of these are used by metallographers in the more extensively equipped laboratories. However these photometers are for the most part quite expensive and their purchase is often unjustifiable in the light of their somewhat limited usefulness. In view of this fact, it seemed advisable to design and build an instrument substantially lower in initial cost and especially adapted to metallographic functions.

In considering the application of the photometer to photomicrography, the requisites of a high quality photo-

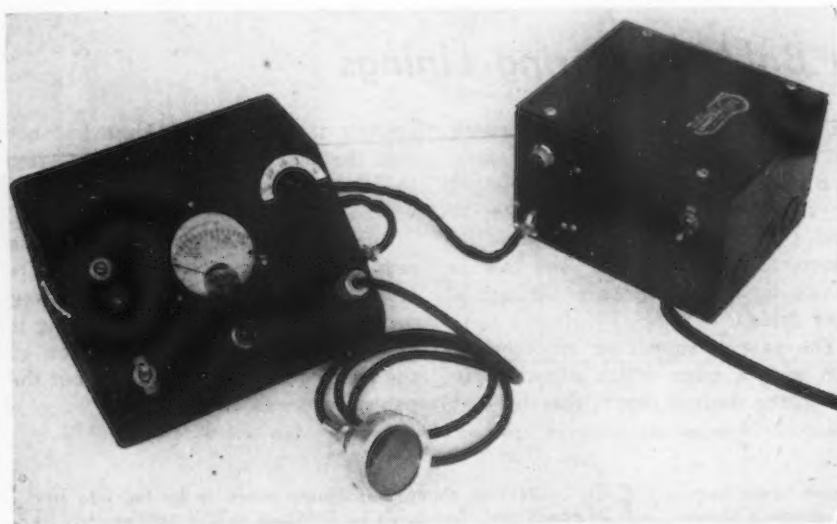
By P. A. HAYTHORNE
and
R. W. POWELL
*Research Engineers,
Lockheed Aircraft Corp.,
Burbank, Cal.*

economy which is often overlooked, is aided immeasurably by negatives which are conveniently printable in large numbers and on normal grades of paper.

In addition to these primary essentials, special procedures in printing often emphasize the importance of uni-

formity in negatives. Of these special procedures, perhaps the most common is the "compositing" of several negatives to make a single final print. More often than not, the negatives to be composited illustrate widely diversified types of microstructures, and for this reason, inconsistencies in negative density must be corrected in order to produce a satisfactory final print. Corrective measures such as "dodging" during contact printing to balance negative densities are, at best, time consuming and somewhat critical manipulations, and furthermore, the results of these methods are difficult to duplicate in the event that additional prints are desired at a later date.

There are few instances where the time spent in preparation of metallographic specimens does not merit the most particular attention to obtaining a photograph as nearly perfect as possible. Frequently, the time consumed in tedious specimen preparation has been expended to no avail when the quality of the final print is not commensurate with that of the metallographic specimen.



ABOVE
FIG. 1—Photometer with power supply at right and photo-cell connected to amplifier unit.

micrograph may be reviewed. Firstly, the metallographer is required to furnish micrographs showing excellent definition and the utmost of detail and sharpness at magnifications up to, and often above, 3000 diameters. Secondly, the brilliance and contrast of photomicrographs must be such as to render micrographic structures readily and consistently interpretable. Thirdly, the factor of darkroom efficiency and



BELOW
FIG. 2—Position of photometer components during operation.

For Metallographers . . .

Hence, from many aspects, it is far more desirable to obtain an initially good negative than to apply corrective technique to a poor one; and it is toward this end that the photometer has served so adequately.

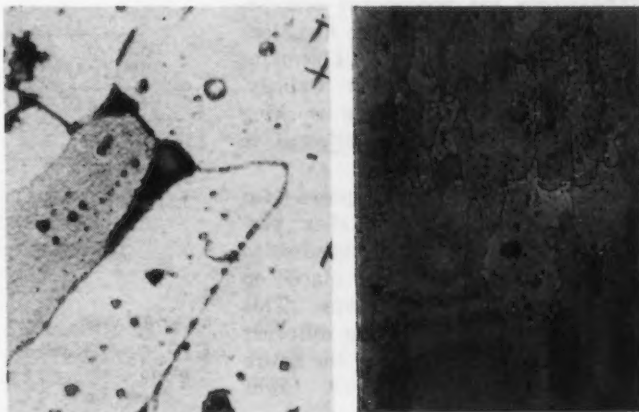
Before dealing with the operational and structural details of this particular instrument, the marked improvement in photomicrographic technique made possible by its use at the Lockheed research laboratory may be summarized as follows:

- (1) Over a period of several months, the quality of photomicrographs has been noticeably improved.
- (2) Savings in time resulting from precise "first-time" exposures have more than made up for the cost of the photometer.
- (3) Consistent uniformly well exposed negatives have effected appreciable economies in darkroom materials and time by obviating the necessity of extensive corrective measures and by facilitating the duplication of prints which are re-ordered at later dates.
- (4) With this instrument, sufficient accuracy is obtained to permit the successful reproduction of microstructures in color. Although the use of Kodachrome film in metallography has been very limited, its increasing popularity warrants precise exposures to properly illustrate true coloration.

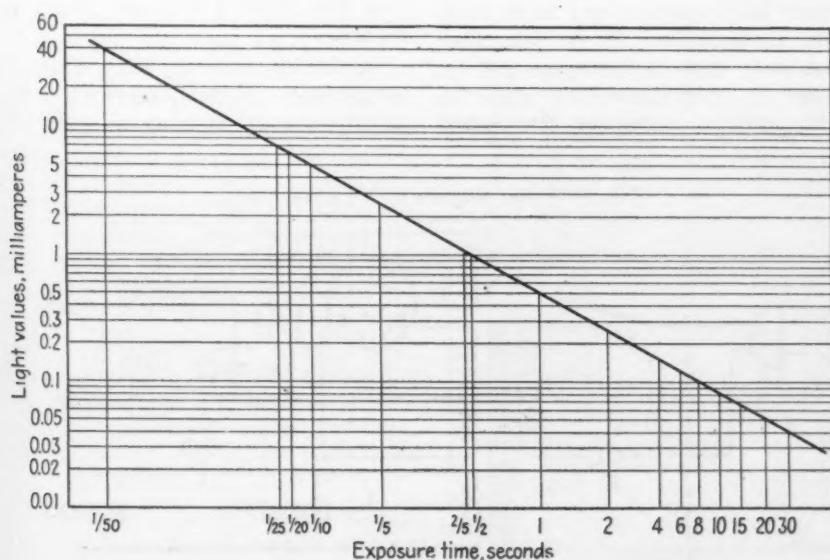
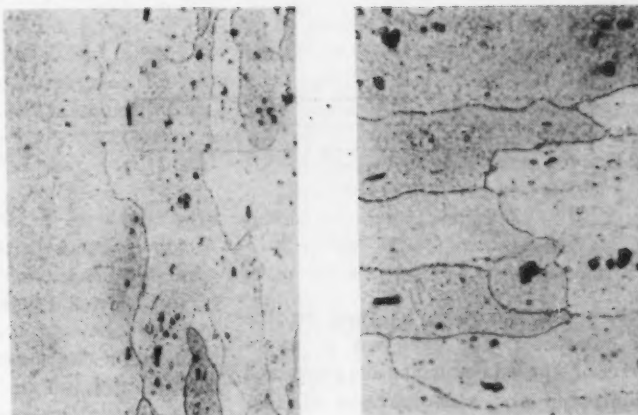
As illustrated in Fig. 1 the photometer consists of essentially three

. . . Described herein is a photometer arrangement of low cost especially adapted to metallographic functions. Use of the equipment saves time and furnishes consistently uniform and well exposed negatives.

RIGHT
FIG. 4—A "composite" print made from negatives of apparently uniform density.



BELOW
FIG. 3—Chart of light values converted to exposure time.



component parts; namely, the power supply, the amplifier and the photoelectric cell.

The power supply and amplifier remain stationary on the microscope table while the cell is held in contact with the ground glass of the microscope camera. The photo-cell is placed over that portion of the image which it is desired to reproduce, while light values are read directly from the milliammeter mounted in the amplifier unit. Fig. 2 illustrates the photometer in use.

Adequate needle deflection on the milliammeter, in order to obtain accurate light values, can be secured by previous adjustment of the range switch to a position suitable for measurement of light intensity without reading off scale.

It is apparent that the necessarily high sensitivity of the photometer makes essential judicious interpretation of light values in the conversion to terms of exposure time. In this line the following three factors contribute materially to correct interpretation:

(1) Familiarization of the operator with the instrument and its use.

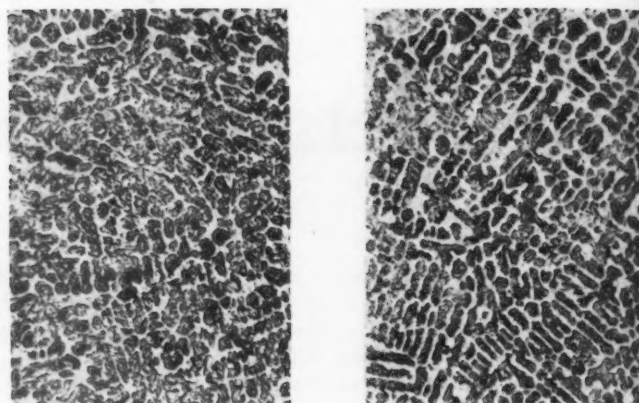
(2) Standardization of all metallographic functions.

(3) An initially good calibration to obtain an accurate conversion chart.

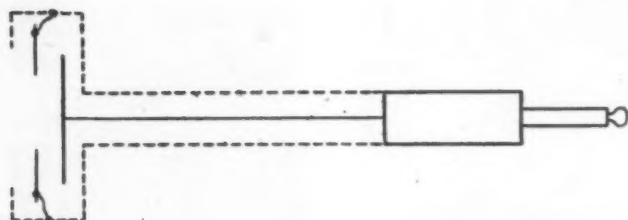
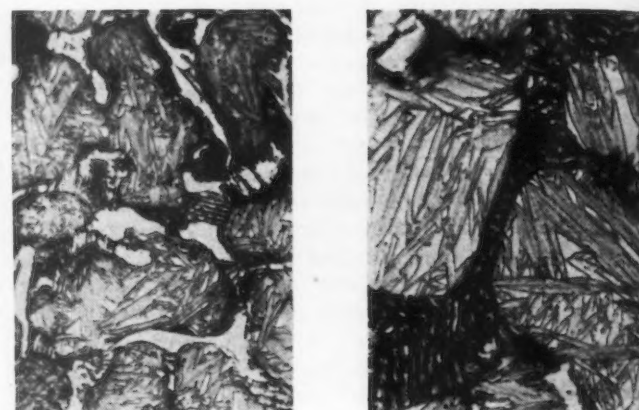
Assuming that the metallographer standardizes his procedures and becomes familiar with the use and limitations of the photometer, it remains only to calibrate the device. Calibration to secure an accurate working conversion chart may be effected in the manner to be described.

Test negatives are exposed for different lengths of time at a permanently set light intensity as afforded by reflection from a mirror placed on the stage of the microscope. This procedure is repeated, using different light intensities which cover the entire scale of the amplifying unit. Light

RIGHT
FIG. 5—A "composite" printed from accurately exposed first-time negatives.



BELOW
FIG. 6—Shielded photo-cell and phone jack.



values are recorded, as read on the milliammeter, for each set of exposures. Exposed negatives are processed identically and a comparison of densities is made against a standard step wedge (a progression of densities established by densitometric methods).

The previously selected density is that tone of black which will render the brightest portions of the image readily printable to proper contrast without the obliteration of other detail. This has been found to correspond to a standard densitometer reading of 0.8. Correct exposures to obtain this ideal density having been established at various points over the range of the photometer, it remains only to plot a curve or chart (light values versus exposure) from these values. A satisfactory conversion chart is shown in Fig. 3, where light values are plotted on a logarithmic scale and the exposure scale is arbitrarily adjusted to obtain an easily readable straight line. It will be noted that the exposure increments can be

made to correspond to any available shutter speeds.

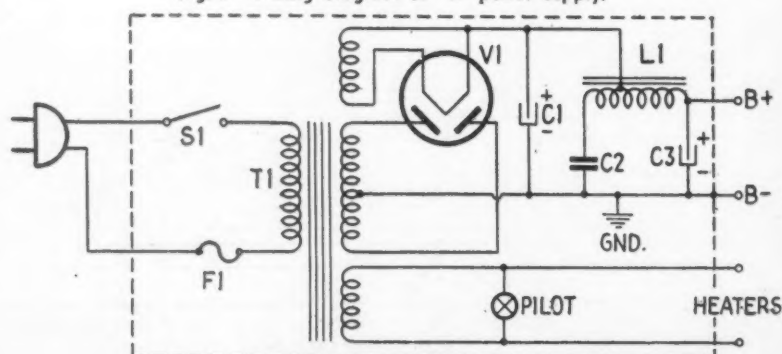
Calibration of the instrument will depend obviously on the type, speed and other characteristics of the particular film employed. In the Lockheed laboratory a medium speed panchromatic film is used almost universally. The Weston rating for this film is 50 in daylight and 32 in tungsten illumination. It is recognized that many types of film are in general usage by metallographers and, for this reason, a conversion chart must

be made for each film whose speed and color characteristics differ. In addition, color response must be taken into account when filters are placed in the microscope illuminating system.

This, however, should not prove to be a source of difficulty inasmuch as the slight discrepancies in color sensitivity of the photo-cell appear to be more than compensated for by the latitude of most film materials. Hence, if calibrations for operations involving color filters are desired, it remains only to insert the filter into the light system and then proceed with calibration as before.

In the illustrations, Figs. 4 and 5, composited photomicrographs are printed without dodging or other cor-

Fig. 7—Wiring diagram of "B" power supply.



rective measures to balance negative densities. Fig. 4 is a print made from four negatives, exposed by approximation and appearing of uniform opacity to the eye. Inequalities in negative density have been exaggerated by printing on a hard grade of paper. Fig. 5 illustrates a satisfactory print on the same grade of paper, but made from negatives exposed as indicated by photometer.

The photometer is a direct reading instrument employing five ranges of sensitivity, from 0.01 foot-candle, producing full scale needle deflection at high sensitivity, to 1 foot-candle for full scale deflection at low sensitivity. Alternating current of 110 volts, 60 cycles, is required for satisfactory operation.

The barrier type photo cell, housed in a duralumin case, is connected to the amplifier input by a flexible concentric cable. Thorough shielding of the cell, cable, and entire amplifier input circuit are essential to prevent electric or inductive pick-up of stray fields which in turn would result in spurious meter readings.

Amplification of the photo cell output is effected by a high gain amplifier responsive to 120 cycles per sec., which indicates that the device is excited only by light variations as afforded by fluctuating or "chopped" light, and not by steady state light such as sunlight which completely fails to produce any instrument response whatsoever. This feature makes the photometer particularly adapted for use in connection with microscopes employing a.c. carbon arc as the light source, wherein the light given off by the arc between periods of current flow is extremely small in comparison to maximum light emission.

Three stages of amplification have been found adequate in this instrument; the first two tubes are high gain voltage amplifiers while the third supplies the power required to operate the meter. To prevent interaction of amplifier tube circuits, and to increase power supply filtering, each plate circuit is provided with a decoupling filter. Condensers of generous size are used throughout to insure a minimum attenuation of the photo cell signal and a maximum suppression of power frequency hum and self induced oscillation. To reduce tube noise, a 1620 type tube is used for the first stage of amplification. A milliammeter (0-1 milliampere) is used as an indicator, the sensitivity of which contributes to overall photometer accuracy.

During use, the "B" power supply, mounted in a steel box, is placed about

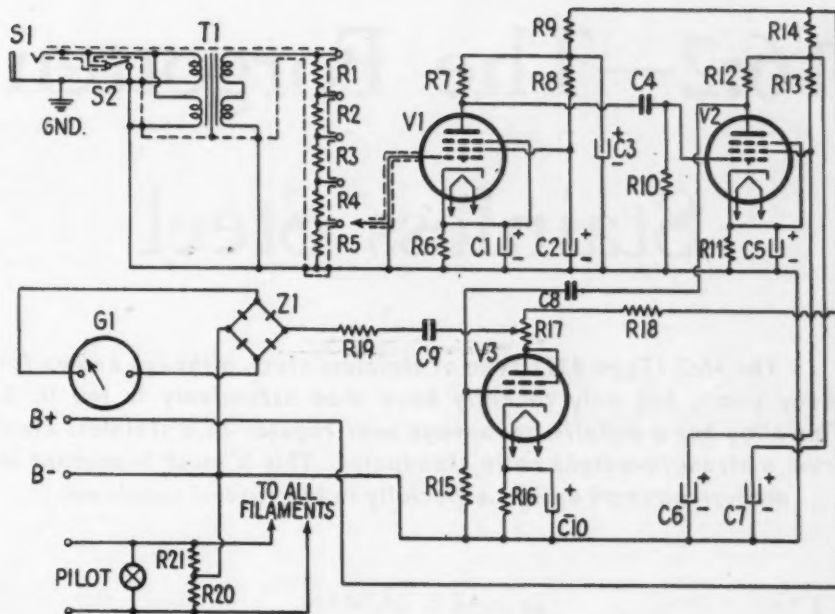


Fig. 8—Wiring diagram for amplifier unit.

3 ft. from the amplifier so that magnetic fields generated by the power transformer and filter choke will not cause false currents in the amplifiers. Hum in the power supply is minimized by a 10 per cent tapped choke in a Meisner hum buck circuit.

Continued and consistent accuracy of the photometer is assured by periodic check against previously established standards. Corrections are made by means of a gain adjustment potentiometer.

Because this meter responds only to fluctuating light, its use in connection with incandescent illuminating systems would result in substantially lowered sensitivity, inasmuch as incandescent bulbs emit both steady and fluctuating light. Furthermore, since

voltage and wattage ratings for incandescent bulbs affect the ratio of total light to fluctuating light, a separate calibration for each lamp of different voltage and wattage is required.

A question may arise as to the advisability of employing the "fluctuating light" principle to the design of this photometer. The reasons may be stated as follows:

- (1) Cost is comparatively small.
- (2) Temperature errors in the photo cell are eliminated.
- (3) The difficulties encountered in the use of notoriously unstable d.c. amplifiers are avoided.

Diagrams of photo cell, power supply, and amplifier unit are illustrated in Figs. 6, 7, 8 respectively.

PARTS LIST

Amplifier

R 1 660,000 ohms
R 2 196,000 ohms
R 3 66,000 ohms
R 4 19,600 ohms
R 5 8,400 ohms
R 6 1,000 ohms
R 7 500,000
R 8 2 meg
R 9 10,000
R 10 1 meg
R 11 1,000
R 12 500,000
R 13 2 meg
R 14 10,000
R 15 1 meg
R 16 350
R 17 2000 ohm 4 watt pot.
R 18 4000 ohm 10 watt
R 19 5,000
R 20 20

R 21 20
C 1 50 mf. 50v
C 2 50 mf. 150v
C 3 16 mf. 250v
C 4 0.001 400v
C 5 50 mf. 50v
C 6 50 mf. 150v
C 7 16 mf. 250v
C 8 0.001 mf. 400v
C 9 1.0 mf. 400v
C 10 50 mf. 50v
V 1 Type 1620 tube
V 2 Type 6SJ7 tube
V 3 Type 6F6 tube
S 1 Phone jack
S 2 S.P.S.T. toggle switch
G 1 1.0 ma meter
Z 1 Conant type BC inst. rect.
T 1 INCA TG 10 transformer

Power Supply

C 1-8 mf. 450v
C 2-1 mf. 600v
C 3-30 mf. 450v
L 1 INCA D-1 choke
V 1 Type 80 tube
T 1 Hadley type P-6211 transformer
S 1 S.P.S.T. toggle switch
F 1 4AG 1 ampere fuse

Photo Cell

Emby photo-electric cell, R-100 "W," self-generating type, stabilized to 70 deg. C. Cell is wired to plug into circuit at S1.

16:2—The Forgotten Stainless Steel

. . . The 16:2 (Type 431) type of stainless steel, although known for many years, has only recently been used extensively in the U. S. This alloy has a definite advantage over regular 18:8 stainless steel from a strength-weight ratio standpoint. This is most important in modern aircraft design, especially in the case of seaplanes.

THE aircraft industry, especially that part engaged in the manu-

By MAX E. TATMAN

*Chief Metallurgist, San Diego Division,
Consolidated Vultee Aircraft Corp.*

facture of flying boats, has had to be concerned with the availability of stainless steel which plays such an important part in seaplane design. In aircraft manufacture, 18:8 (18 per cent chromium and 8 per cent nickel) is the most used of all the steels which are classified as stainless.

The 16:2 alloy, which has been used by the British for many years is, however, finding increased use in high strength fittings on many airplane structures. Plain chromium stainless steels were formerly used only to a very limited extent because of their inferior corrosion resistance as compared to 18:8 stainless. However, due to the short life of the modern aircraft in wartime service, the Armed Forces are approving increasing amounts of plain chromium stainless steels as a substitute for the more corrosion resistant steels.

Few aircraft manufacturers are cognizant of the fact that weight can be saved by using 16:2 stainless steel, heat treated to 175,000 lb. per sq. in. tensile strength, as a substitute for 18:8. Moreover, weight is not the only saving effected by this substitution. Approximately 2 per cent chromium and 6 per cent nickel or 31 per cent of the alloying metals are saved by such a substitution.

It is quite true that the 16:2 alloy, known as Type 431 commercially and as AN-QQ-S-770 by the Services, was at one time quite tricky to melt and required a careful heat treatment. However, the steel mills manufacturing stainless have improved their technique to the extent that they now

make this type practically as any of the other types. Furthermore, heat treat-

ing characteristics of the 16:2 type have now been more completely investigated.

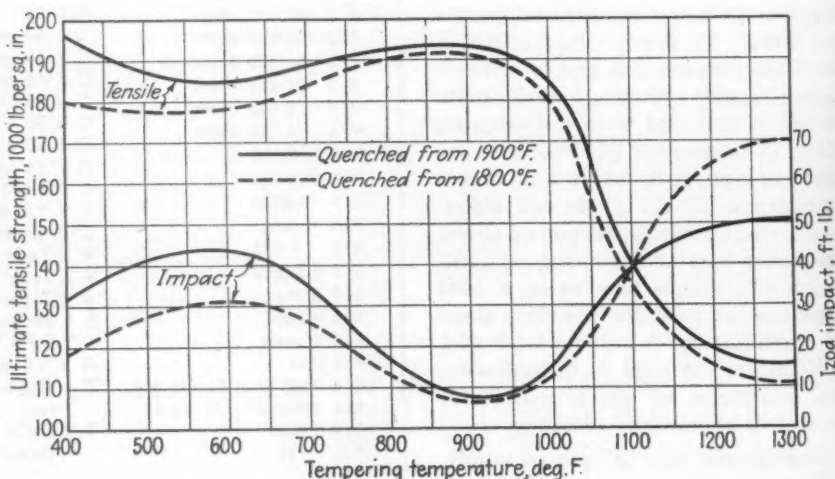
The following discussion indicates some of the improvements developed through recent research programs.

At the time 16:2 stainless steel was first used commercially in the United States, little was known about the heat treating characteristics of this alloy. To be sure, the British had been using this alloy for some time, but they were using it at approximately 125,000 lb. per sq. in. tensile and the other requirements were none too stringent. For lack of information, the manufacturers of aircraft parts in the United States used the heat treating cycles recommended by the British.

Some of the American users of

16:2, being somewhat scientific in their processing, decided to investigate the mechanical properties of this alloy after being quenched from 1800 deg. F. (recommended by the British) and tempered at various temperatures. In general, the various investigators found that the tempering curves for the 16:2 alloy were similar to the dotted curves of Fig. 1, which represent the early findings of Consolidated Vultee researchers. The low portion of the impact curve in the tempering range of 800 deg. to 1000 deg. F. explained the failures by impact of some of the early parts made from 16:2 stainless and tempered in this range. The Navy specification (M-286b) covering this alloy was revised and issued on Nov. 28, 1939 as M-286c, which established for the first time an Izod requirement (35 ft.-lb.). It also set up another precaution towards preventing impact failures in parts made from the alloy by stating that this material could not be tem-

FIG. 1—Tensile and impact strength of 16:2 stainless steel, quenched from 1800 deg. and 1900 deg. F. and tempered.



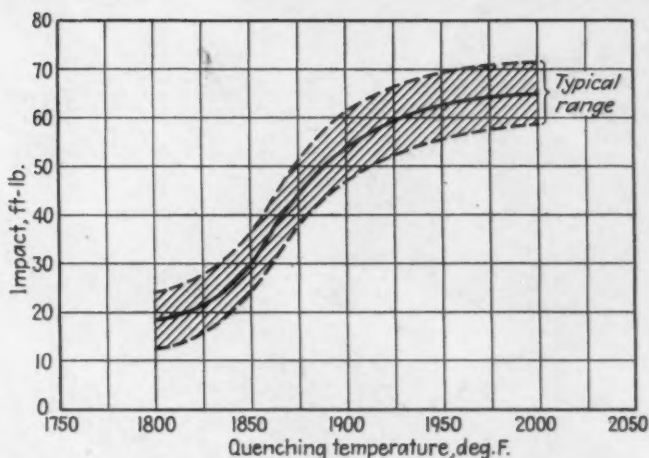
pered between 750 deg. and 1100 deg. F.

Theoretically, the new specification was ideal from the purchaser's standpoint. However, it was not long before the aircraft companies found that many heats of the 16:2 alloy, while meeting the broad chemical requirements in every respect, would not meet the impact and tensile yield of 35 ft.-lb. and 135,000 lb. per sq. in., respectively.

Consolidated Vultee, as well as other companies, immediately began new investigations on 16:2 stainless steel, for the purpose of developing a heat treating cycle which would result in at least the minimum mechanical properties stated by specification when any of the various combinations of chemical analysis, permitted by the broad chemical specification, were treated. After a few preliminary tests at C.V.A.C., it was apparent that raising the quenching temperature from 1800 deg. to 1900 deg. F. greatly increased the impact strength of 16:2 stainless steel.

The results of more thorough tests at a 1900 deg. F. quenching temperature are shown graphically by the solid lines in Fig. 1. It should be noted that the 1900 deg. F. impact curve is higher than the 1800 deg. F. curve in the tempering range below 1100 deg. F., but is lower in the tempering range above 1100 deg. F. Therefore, when a 175,000 lb. per sq. in. heat treat is desired, the quenching temperature should be approx-

FIG. 2 — Izod impact strength of 16:2 stainless, quenched from various temperatures and tempered at 525 deg. F. from 2 to 4 hr.



imately 1900 deg. F. or higher. However, in the case of 115,000 lb. per sq. in. heat treatment, the quenching temperature should be approximately 1800 deg. F. followed by a 1150 deg. F. tempering operation.

A series of tests was then carried out by C.V.A.C. and by other investigators which determined the optimum quenching temperatures. Several heats of 16:2 stainless were soaked at various temperatures between 1800 deg. and 2000 deg. F. for ½ hr., followed by an oil quench and a tempering operation at 525 deg. F. for 2 to 4 hr. From the results of these tests, shown graphically in Fig. 2, it should be noted that the impact properties rise sharply between 1800 deg. and 1900 deg. F., while above 1900 deg.

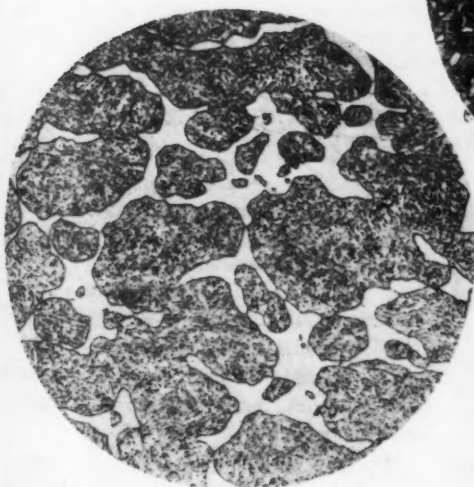
F. the rate of increase is rather low. Since the higher temperatures set up considerably more quenching strains and are more severe on the furnace equipment, Consolidated Vultee has been using for several months a 1900 deg. to 1925 deg. F. quenching temperature. It is of interest to note that Amendment 2 of AN-QQ-S-770, which has just recently been released, permits the quenching of 16:2 stainless from 1850 deg. to 1950 deg. F. for the 175,000 lb. per sq. in. heat treat (Class I), and 1800 deg. to 1900 deg. F. for the 115,000 lb. per sq. in. heat treat (Class II).

Tests made on several heats and sizes of 16:2 stainless indicated that a soaking period of ½ hr. to 1 hr. at 1900 deg. F. was ordinarily sufficient

(CONTINUED ON PAGE 160)

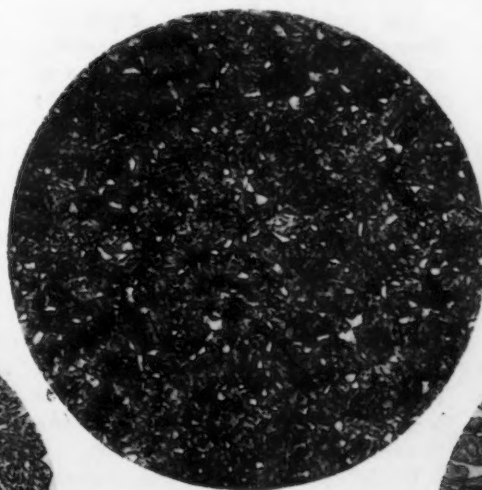
BELOW

FIG. 3a — Heat treated 16:2 stainless with large delta ferrite grains; transverse section, 200 diameters.



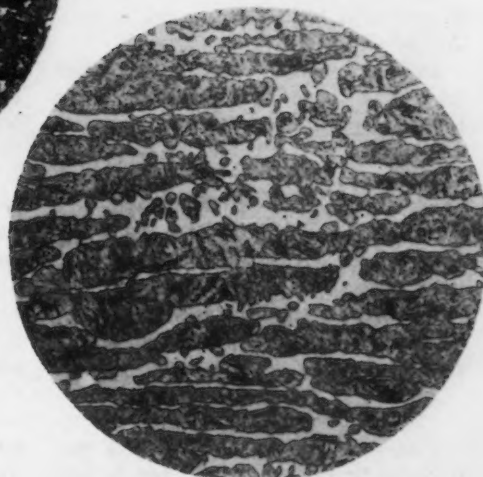
ABOVE

FIG. 3b — Heat treated 16:2 stainless with small delta ferrite grains; transverse section, 200 diameters.



BELOW

FIG. 3c — Heat treated 16:2 stainless with lamellar delta ferrite grains; transverse section, 200 diameters.



Worn Parts Rebuilt

By "Two-Tone" Arc Welding

By J. A. CUNNINGHAM
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FIG. 1—Application of the "two-tone" arc welding technique to building up tractor track rails. Electrode (left) is an E-6010 type while the filler rod (right) is bare alloy cast iron, such as Moly H. • • •

... A new technique using an auxiliary cast iron or high carbon steel filler rod in conjunction with an arc welding electrode speeds up rebuilding of worn surfaces by as much as 300 per cent. Originally applied to the repair of contractors' equipment, the process should find use in maintenance of all kinds of heavy machinery subject to abrasive wear.

SCARCITY of both labor and replacement parts for tractors and shovels used in the construction industry has led to the development of a fast method of hard surfacing worn parts that should find application in many other fields of maintenance welding. This so-called "two-tone" technique of hard surfacing consists of welding in the conventional manner with a mild steel electrode in the holder while a cast iron or high carbon steel auxiliary filler rod is held adjacent to the arc, Fig. 1. Equal quantities of the electrode and filler rod are consumed but the burn-off rate of the electrode is 30 to 50 per cent faster than normal because about 30 per cent higher amperage is used on the electrode.

In this welding process the electrode and the filler rod mix together thoroughly, giving a high carbon, low alloy steel deposit which resembles low alloy tool steel in grain structure, hardness, toughness and wear resistance. The coating on the electrode mixes with the weld metal and rises to the top in the usual manner. With this method deposits will not shatter or spall off, nor will they check when welded in a wide weave.

Increased Welding Speeds

Two-tone welding is fast since two to three times more metal can be ap-

plied per hour than by ordinary methods. Contrary to expectations, it is easy to control the deposit, even on narrow sections and on comparatively thin stock, because the operator can feed in more auxiliary rod at will to chill the molten metal.

The welding operator holds the filler rod (which carries no current), in front of the arc in the direction of travel. The arc is not directed on the filler bar, but is pointed on the work in the usual manner. The electrode is tilted backward from the direction of travel instead of forward, thus permitting a small portion of the arc to bite into the filler rod and melt it down. Best results are obtained by holding an arc of average length (28-32 volts). The arc is started by welding without the filler rod in the arc area for approximately 2 sec. to acquire a molten pool before feeding in the filler rod.

While $\frac{1}{4}$ in. filler rod is satisfactory, $\frac{3}{8}$ in. is preferred since it consumes less rapidly and therefore, the tip of the rod can be maintained at a higher temperature. Smaller filler rods burn off so rapidly that the rod is still cold as it approaches the arc and "sticking" may result. Filler rods larger than $\frac{3}{8}$ in. are satisfactory, but require more amperage for melting and are more difficult to manipulate. Electrodes $\frac{1}{4}$ or $\frac{5}{16}$

in. are used in the holder but smaller electrodes, $\frac{7}{32}$ in. or $\frac{3}{16}$ in. size, may be used when the welding machine is not capable of producing enough amperage for $\frac{1}{4}$ in. electrodes.

When an a.c. transformer type welder is available, E-6030 or E-6020 electrodes (commonly called hot rods) can be used in the two-tone process, if the work is flat or positioned at an angle of 5 to 10 deg. However, it has been found that on all types of work an E-6010 electrode with a d.c. arc welder is usually preferable. Furthermore, the operator can produce a thicker deposit when using an E-6010 electrode because the deposit freezes faster, thus allowing the operator to weld near an edge or on a curved surface. Straight polarity all-position electrodes can be used with a a.c. or d.c. welders, but E-6012 electrodes are not generally recommended because the arc is not sufficiently penetrating to bite into and mix thoroughly with the filler rod.

High Quality Deposits

In making repairs to crawler type tractor parts, a $\frac{1}{4}$ in. mild steel reverse polarity type electrode (AWS Class E-6010) is used in conjunction with a $\frac{3}{8}$ in. bare alloy cast iron filler rod, such as Moly H. The micro structure obtained, Fig. 2, consists of fine martensite and is not machineable. Such a deposit will withstand severe shock, edge impact and moderate abrasion.

The photomicrograph, Fig. 3, shows a two-tone deposit made with Amsco



FIG. 2—Photomicrograph of a two-tone deposit made with a G. E. W-22 electrode and Moly H filler rod, magnified 500 times. Hardness, 55 Rockwell C, ductility, zero but resistance to impact very good. This is an unusually hard specimen consisting of fine martensite because it was deposited as a narrow bead and cooling was sudden.

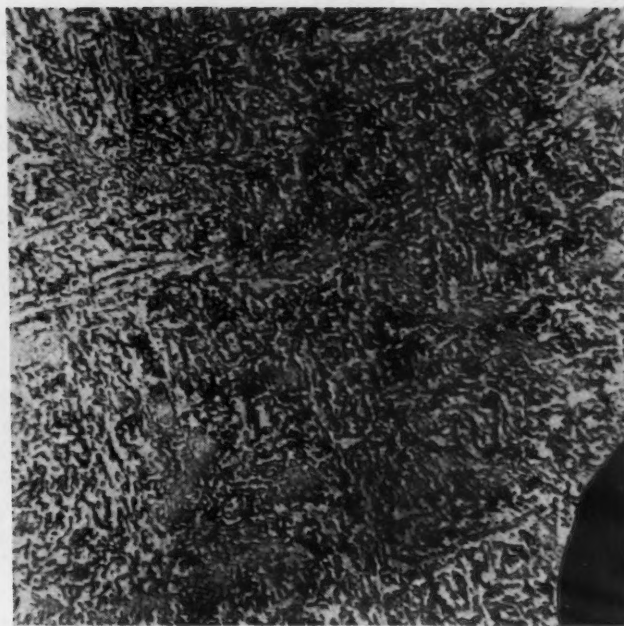


FIG. 3—Photomicrograph of two-tone deposit made with W-22 electrode and bare "Economy" filler rod, magnified 500 times. Hardness, 33 Rockwell C. Estimated ductility, 5 to 10 per cent. Tensile strength, 150,000 lb. per sq. in.

"Economy" high carbon steel filler rod laid on with G.E. W-22 Class E-6010 electrode. Such filler rod as this is used on high carbon or excessively worn tractor rails to insure proper strength and resistance to cracking. It can also be used on many other applications such as repairing worn wobblers and coupling boxes in rolling mill drives, building up crane wheels, rail ends, etc. Such deposits are machineable with cemented carbide cutting tools, but grinding is generally more satisfactory.

When parts are subjected to extreme wear a $\frac{1}{8}$ to $\frac{5}{32}$ in. layer of harder and more wear-resistant metal can be applied over the two-tone deposits with a regular hard surfacing electrode, such as Moly H. This will also help to obtain a smoother deposit.

Use of Filler Bars

Use of mild steel filler bars in connection with two-tone welding is another way of speeding up repairs when badly worn sections are to be built up. Concrete reinforcing rods or any type of mild steel bars or nickel manganese bars have been used in rebuilding worn parts on tractors and shovels. For instance, one edge of a bottom roller on a tractor may be completely broken or worn away due to misalignment or other cause. By welding a $\frac{3}{8}$ or $\frac{1}{2}$ in. steel bar flush with the roller face around the circumference and then filling in with a hard facing material or hard facing over a two-tone layer, the repair can be greatly speeded up. Fig. 4 shows two-tone welding being used to back up the filler bar on a rebuilt bottom

roller of a tractor. On applications of this nature where the weld metal can be dammed, the operator can apply approximately 25 lb. of weld metal per hr.

Another example of the use of applicators is the rebuilding of a bottom roller of a power shovel which was worn down on the periphery and galled along the sides. In making the build up, mild steel bars were welded around the periphery on each side and two-tone welding with a $\frac{1}{4}$ in. E-6010 electrode and a $\frac{3}{8}$ in. plain cast iron bar was used to fill in be-

tween the bars. By positioning the wheel with respect to the molten pool, the entire worn section was built up at one pass. The applicator bars acted as a dam and prevented the molten metal from flowing over the edges. With the same pair of rods, a large, single pass fillet weld was used to back up and completely cover the filler bar. Applicator bars have also been used to fill out the edges of worn tracks on power shovel crawler shoes.

Photographs by Courtesy of General Electric Co.

FIG. 4—Two-tone welding is used to back up the applicator bar on the rebuilt bottom roller on crawler tractors.



Magnesium Alloy Foundry S

ONE of the most important factors in any foundry is its sand practice. This is especially true in a magnesium alloy sand casting foundry because: (1) at present all magnesium alloy castings are diverted to aircraft construction and aircraft manufacturers place much emphasis and high value on smooth surface finish; (2) the inherent low density of the alloy; and, (3) molten magnesium oxidizes at temperatures above its melting point.

All but a small percentage of our country's present production of magnesium alloy castings are cast in sand. Sand is, therefore, the most widely discussed subject among magnesium foundries and it is very unlikely for a foundry to enjoy any measure of success without an adequate sand practice and a systematic method of control.

For another article on magnesium in the foundry, see "Magnesium Casting Practice," Sept. 2, 1943, p. 57.

Magnesium alloys can be cast in

synthetic, natural, or bank sands. The current practice of our American foundries is in favor of synthetic sand whenever it is available, despite its higher initial cost. The factors that govern this trend are as follows: (1) grain size is easily controlled and, therefore, more uniform; (2) it is almost free of clay; (3) it has greater permeability to gas; and, (4) it is free of organic and other foreign matter which plays so much havoc with the casting.

It is very essential that magnesium alloys be cast in a sand that is very permeable. Magnesium being of a very low density and, therefore, very light, should flow into the mold with great ease and with little or no back pressure from the air in the mold. Another point in favor of open sand is that it requires less tempering with

water. Excessive moisture will oxidize the casting.

Sand that is prepared from quartz which has been washed and dried with an average A.F.A. grain fineness of 68 to 80, round grained, having a permeability of 110 to 150 and a compression strength of 6.5 to 8.5 lb. per sq. in., produce good results.

Since synthetic sand is free from clay it is necessary to mix it with some binder in order to hold it together and the practice is toward such binders as Bentonite in preference to natural clay. It has been found that 2.5 to 3.0 percent of Bentonite should produce a good and workable sand.

The moisture content of the sand should be held to the lowest possible minimum. It is well known that molten magnesium reacts with moisture by decomposing it and brings about the formation of a magnesium oxide. This process liberates hydrogen and will cause the surface of the casting to become black, and cause the formation of a gray-black powder on the surface which is often referred to as

FIG. 1—Hoppers of overhead sand conveyor system are located directly over molding machines at Hills-McCanna Co. foundry, Chicago.



y Sand Control

By OSCAR BLOHM

Chief Metallurgist, Hills-McCanna Co.,
Chicago

burns. This condition may not stop on the surface but will often penetrate to the interior of the casting and result in its being scrapped. Another point in favor of holding the sand to a low moisture is that while the hydrogen is being released during the contact of the molten magnesium with the moisture in the mold, the released hydrogen will combine with the trapped air in the mold and again form water which in turn again reacts with the molten metal and causes a burning of the sand closest to the surface of the casting. It is the practice of many foundries to introduce into the mold, just prior to pouring, as an additional precaution, a reducing gas such as sulphur dioxide, which minimizes oxidation of the hydrogen and the subsequent formation of the water.

The Germans were the first to experiment with inhibitors to prevent reaction of the magnesium with the sand. Their first attempt was to add sulphur and later a mixture of sulphur and boric acid. Boric acid is a somewhat unreactive compound which

... Described are the binders and inhibitors to be used and the preferable practice as regards mixing and mulling of foundry molding sand to give magnesium castings of soundness and smooth surface finish.

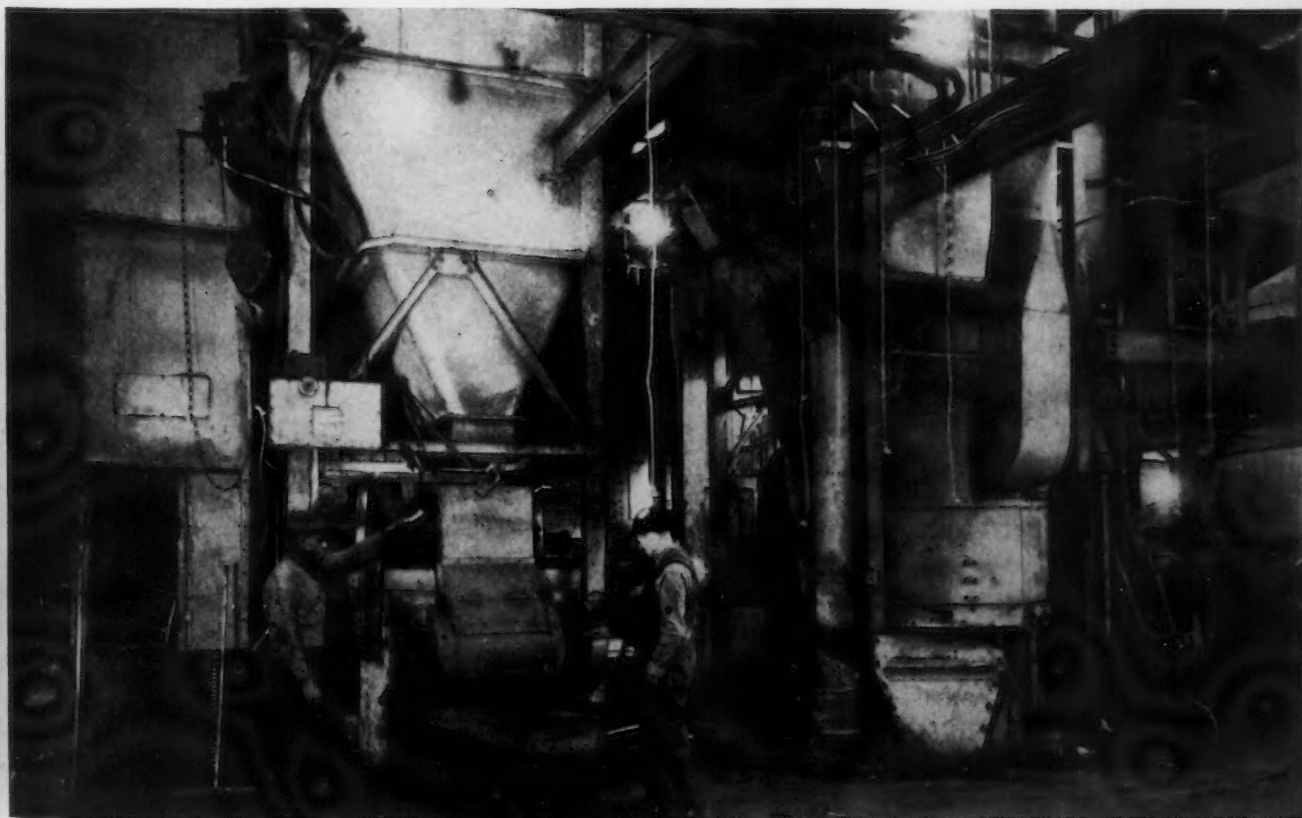
does not readily dissociate in the presence of water but decomposes at approximately 375 deg. F. to form an inert gas and acts as a buffer.

Since high quantities of sulphur will greatly impede the flow of magnesium, the English and the Americans began to search for a chemical that would enable them to reduce the percentage of sulphur in the sand. They discovered that the fluorides, such as silico fluoride, hydro-fluoboric acid, ammonium fluoride, and a va-

riety of others, were suitable agents with good inhibiting qualities. The current practice is and has been for some time the use of ammonium silico fluoride. This agent is a water soluble complex salt, rather stable and low in cost. There are a few foundries that use a cheap grade of commercial sulphuric acid instead of the ammonium silico fluoride and claim to be getting good results but they are, as we stated, in the minority.

When using a synthetic sand with an A.F.A. average grain fineness of 70 to 80, good results can be obtained by maintaining the following concentration of inhibitors (in percentage): sulphur 0.65 to 1.0, boric acid 1.0 to 1.5, ammonium silico fluoride 2.5 to 3.5. These inhibitors, in order

FIG. 2—Left, manually operated sand muller; right, conveyor operated muller. The manually operated muller feeds the squeezers and the conveyor type, the big roll overs.



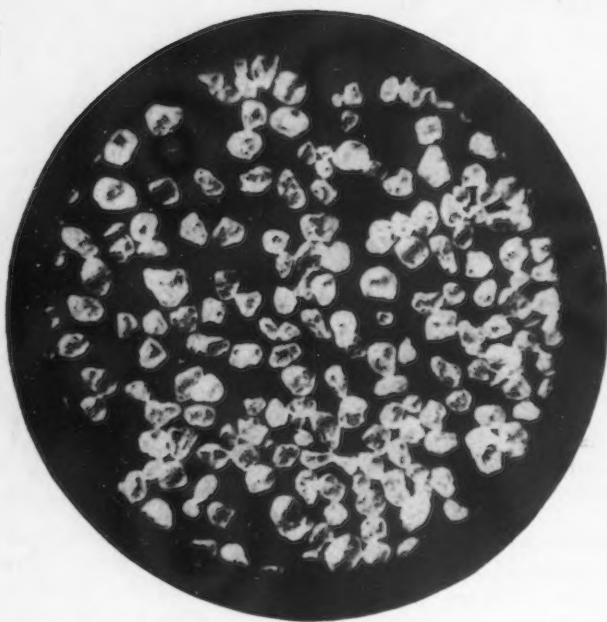


FIG. 3—New molding sand, 15 diameters: Ottawa washed and dried, AFA grain fineness 70-80.

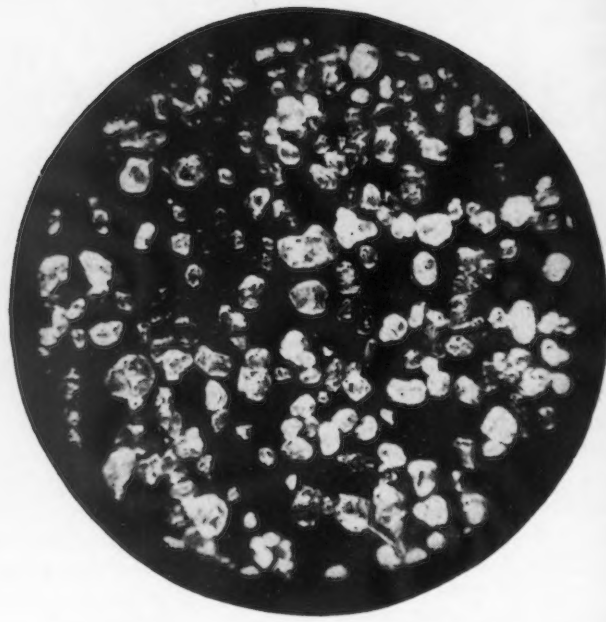


FIG. 4—Reclaimed molding sand, 15 diameters: Ottawa washed and dried, AFA grain fineness 70-80.

to be effective, should form an inert gas, reduce the fusing point of the sand, and coat the grain particles of the sand with the fused substances.

To obtain the best results it is advisable to use a mechanical mixer for mulling. The muller should be equipped with (1) a screen to remove lumps and foreign matter; (2) a magnetic separator to remove rust, small pieces of iron, chills and wires; and, (3) an areator. The sand should be handled from a central system to insure uniformity of control. The mulling time of the sand will vary with the job but it is always best not to under-mull but to mull a sufficient length of time to obtain a good and workable sand.

When preparing new sand it should be mulled after the addition of all the inhibitors and the moisture for at least 30 to 60 min. A new sand mixture that has been found to give good results when using a synthetic sand washed and dried with an A.F.A. average grain fineness 70-80, follows:

Sand	800 lb.
Bentonite	10 lb.
Ammonium silico fluoride	26 lb.
Sulphur	7 lb.
Boric acid	10 lb.
Diethylene glycol	2 lb.
(approximately 1 qt.)	
Moisture	5 to 8 qt.

Glycol in the amount of about 0.25 per cent will serve to maintain the sand with a low moisture because the glycol will prevent any excessive drying of the sand and it is well worth the cost to use this agent.

In conclusion, a brief statement may be given of a few points of caution which should always be kept in mind:

- (1) Sulphur should be kept low. It retards the flow of the molten metal and a high concentration will result in misruns and cold shuts.
- (2) Ammonium silico fluoride reduces the fusing point of the sand and the heavy concentration of this agent will cause the sand to harden in lumps. A chemical analysis of this agent should be made daily and additions be made in accordance with the findings, and not

indiscriminately or by guess method. The same is true for the sulphur. It should be chemically analyzed each day, and additions made accordingly.

- (3) Bentonite in excessive amounts will cause the sand to become "Gooley" and sticky and will cause the sand to ball up. Therefore, Bentonite should be added only after a compression test, made on regulation equipment, shows that it needs it. Undermulling of the sand will give an appearance of weakness and whenever the sand shows such symptoms it would be wise to increase the mulling time be-

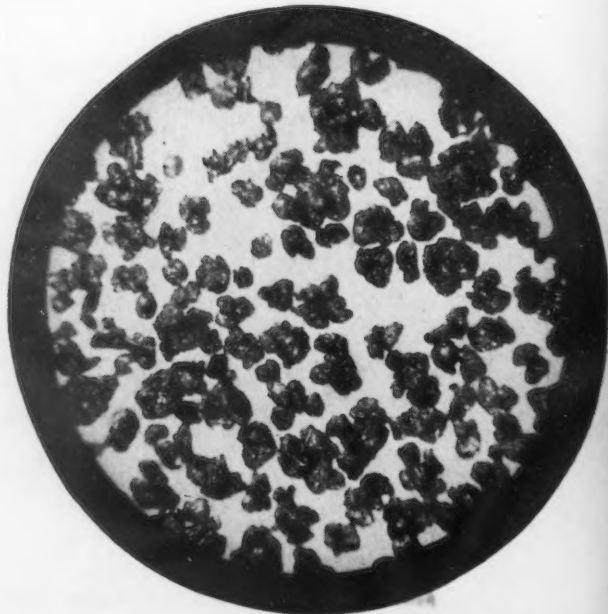


FIG. 5—Discard molding sand, 15 diameters: Ottawa washed and dried, AFA grain fineness 70-80.

fore any addition of Bentonite is made. If trouble is experienced with dropping copes it may not be a weakness of the sand. It could easily be the result of high moisture content, which makes the sand appear strong when it is weak. Compression and permeability tests should be made at least every hour. Moisture tests should be made whenever possible of each muller load, batch or heap.

(4) Great care should be taken to keep the sand free from small particles of rust which will cause blows if they are located on the surface of the mold close to the proximity of the casting. When using overhead hoppers the interior of the hopper should be kept clean and the corroded parts of the metal be removed at frequent intervals in order to prevent them from falling into the sand. The same is true of foreign substances

such as small pieces of wood and cigarette butts because they too will cause blows when contacted by the metal.

(5) It would be advisable to refresh the old sand by constant additions of new sand into the shakeout pit. This will maintain the average grain fineness and prevent any accumulation of fines. It is suggested that these additions represent about one to two per cent of the total sand in the pit.

Instrument Signals Spot Weld Consistency

PHOTOELECTRIC equipment has many applications in the welding industry. One instrument, called a weld comparer, warns the operator by means of a single stroke gong whether the input of a resistance welder is within allowable limits for constant spot welds of highest quality. It consists of:

1. Comparer instrument (ballistic ammeter).
2. Phototube housing, light source and phototroller.
3. Single stroke gong.
4. Current transformer.
5. Range switch and sensitivity control.

The pointer on the ammeter has a mirror facing the rear mounted on its side, near the meter scale. An aperture is provided in the meter dial about midscale, through which the light source projects a beam of light. Thus, when the mirror is in front of the aperture, light is reflected back to the phototube which is connected to the grid circuit of a thyratron tube.

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East Pittsburgh, Pa.*

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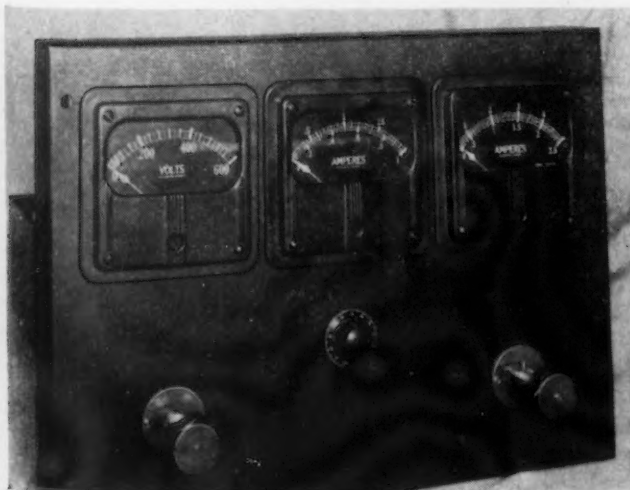
The impulse created by the light on the phototube results in a small current flow to the grid which is amplified to such a value that it can actuate the single stroke gong, through a suitable relay.

By adjusting a potentiometer, the operator first selects the proper range over which he expects to operate his machine. Since the ballistic ammeter is connected in the welder circuit through a current transformer, every time the welding machine is used the pointer will swing in proportion to the current flowing through the primary of the welding transformer. When the correct value of current is flowing, the pointer will swing to the

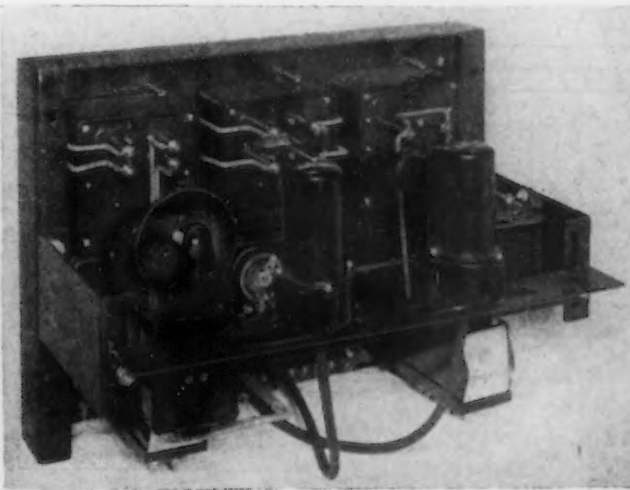
center position of the meter and the light reflected from the mirror to the phototube will cause the gong to operate once. When the welding current is below the lower limit, the gong will not operate. If, on the other hand, the current is above the maximum limit, the pointer will swing past the aperture on the way up and on the way back, thus sounding the gong twice. After the operator has determined the correct value of time and current for the weld, the setting is left unchanged for duplicate welds.

It is not difficult to adapt the above scheme to other applications. For instance, by replacing the ammeter in the above arrangement with a weighing scale, it can be installed in a shipping room as an indication to the loader of a truck that he has reached his load limit. This reduces loading time since the loader does not have to look at the scales to determine the load.

FRONT view of spot welding instrument panel showing ballistic ammeter for ampere-second consistency indication.



REAR view of spot welding instrument panel illustrating gong, light source and phototube housing. Phototroller is separately mounted.



Westinghouse Machine Tool Forum

CLOSE to 400 machine tool engineers and executives crowded the meeting rooms of the William Penn Hotel in Pittsburgh last week to catch up on the latest trends in machine tool electrification, to trade criticism of products and services and to ponder post-war problems. The occasion was the ninth annual Machine Tool Electrification Forum held under the auspices of the Westinghouse Electric & Mfg. Co. Frank discussion of motor and control design and application, including open criticism of shortcomings of electrical apparatus, characterized the sessions crowded into two days, May 1 and 2. Even the relative merits of building one's own control panels rather than purchasing complete units were openly aired to the extent of even mentioning the unmentionable—price comparisons.

In discussing new ideas for machine tool electrification, G. A. Caldwell, industry engineering division of Westinghouse, indicated that the Mot-O-Trol electronic drive, which was described at the Westinghouse Forum last year, is already considered standard equipment on several types of machine tools. He predicted that it will probably be the most widely used piece of electronic equipment.

Mr. Caldwell pointed out that there were many types of drives where it is desirable to vary the speed range automatically to meet variations in

load conditions, such as on a milling machine, where it is desirable to maintain a constant load on the motor if cutter breakage is to be avoided when making cuts of irregular depth. If the feed drive of the milling machine is equipped with a wide speed range adjustable speed drive, a simple arrangement has been worked out which measures the load on the a.c. motor and automatically adjusts the feed speed to maintain the load on the spindle motor to some predetermined value.

To use this system to the best advantage requires the use of an adjustable voltage drive which can be either of the M-G set or the electronic type. The basic scheme when using an a.c. spindle motor is shown in Fig. 1. On the assumption that the load on the a.c. motor is roughly proportional to the line current, a current transformer is connected in one phase of the a.c. motor and fed into a rectox unit which rectifies the output of the current transformer into a direct current which is proportional to load and which can be used as a control current in the adjustable voltage system of the d.c. feed motor to vary the feed speed.

On milling machines where two or more spindles are driven by separate motors, the output circuits of the rectox units are connected in series. This arrangement automatically measures the maximum current of any one of the motors and the feed motor is regulated to automatically

maintain the desired load on at least one of the cutter motors at all times, it being assumed that the other motors are operating at less than full load.

Electronic Tracer Mechanism

A new type of electronic tracer mechanism for machine tools was also described by Mr. Caldwell. The basic scheme is illustrated in Fig. 2, in which any change in the contour of the model causes the tracer mechanism to be deflected and to open or close suitable contacts, thus controlling the lowering or raising of the cutter head. In the Westinghouse unit the tracer mechanism has a universal probe which is sensitive to movements of 0.0004 in. and causes multiple contacts of a Silverstat unit to be opened or closed in the main body of the tracer. Closing these contacts changes the resistance of circuits in an electronic amplifier which in turn causes field current in a d.c. generator to flow in the proper direction. This d.c. generator develops a voltage resulting in current flow through the d.c. feed motor, thus causing the cutter head to move in the proper direction to restore the tracer mechanism back to its balanced position which it is constantly striving to maintain.

In this device, the conventional adjustable voltage drive is being used in connection with electronic control of the generator field to operate a feed motor over a wide speed range. The electronic amplifier used with the tracer mechanism can also be employed as a speed regulating device, giving a wide speed range in the feed drive when the tracing operation is not required. Thus standard machine tools of adjustable voltage feed can be made suitable to operate with the tracer mechanism to do profile milling.

Mr. Caldwell also indicated how on large machine tools, like a boring mill, the relation between the rotation of a table and the feed of the tool can be obtained for a range of 1500:1, through the use of Servo mechanisms employing a synchro-tie transmitter connected to the table and a synchro-tie receiver connected to the feed screw of the crosshead. Between the transmitter and the re-

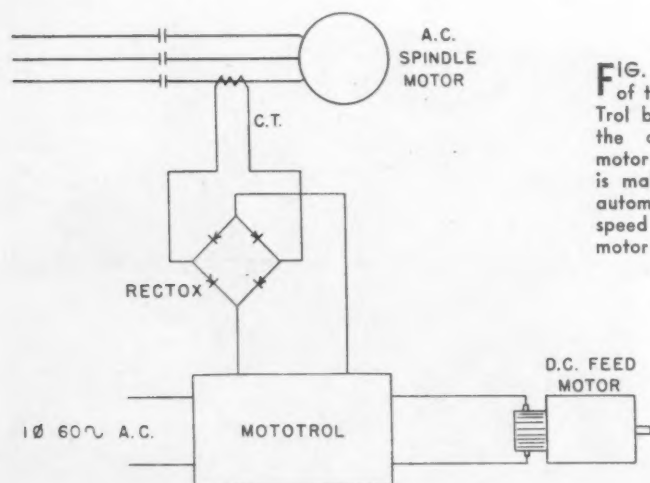


FIG. 1—New application of the electronic Mot-O-Trol by which the load on the a.c. spindle driving motor of a milling machine is maintained constant by automatically varying the speed of the d.c. feed motor in step with driving motor current.

Attracts Biggest Attendance . . .

ceiver there is electrically connected a third synchro-tie unit which operates as a differential. There is no slip in the system and the feed motor turns in exact proportion to the table rotation so that a fixed feed per revolution of the table is obtained. More recently the differential synchro-tie unit and its mechanical regulator has been replaced with an electronic amplifier which provides higher sensitivity and anti-hunting features, thus making the motor operate more smoothly for a wide speed range, especially at the lower speeds.

Electrical Shortcomings

A number of shortcomings of electrical equipment for machine tool application were pointed out by L. W. Scott Alter, president, American Tool Works Co. He reviewed comments obtained from a questionnaire sent to machine tool engineers. One of the chief demands today is for standardized mounting dimensions of fractional horsepower motors needed for energizing auxiliary movements. Greater interchangeability is required and the use of more copper and iron was suggested in order to "beef them up" and increase their reliability.

In general, Mr. Alter complained of inaccuracies in motor manufacture. The distance from the shaft centerline to the bottom of the feet should be held within at least 0.002 in., he maintained, if the "tailoring" of motor plates to individual measurements is to be avoided. He also suggested that the mounting feet be maintained flat and parallel within ± 0.0015 in. and that the shaft be held parallel with the base within 0.001 in. per 6 in. of length.

Present dimensional tolerances for flange mounted motors are too broad to suit machine tool builders, who require out-of-square tolerances between shaft and flange not over 0.001 in. and out-of-round tolerances not in excess of 0.002 in. Shaft extensions vary all over the map, Mr. Alter stated. Frequently the space allowed between the flange and the motor proper does not leave room enough to insert hole bolts of adequate length. He suggested locating mounting holes 45 deg. away from the flange

body bolt holes to eliminate interference.

Both Mr. Alter and later speakers indicated that totally enclosed fan-cooled motors should be standardized for machine tool applications in the postwar era. Other suggestions made by the speaker included the amplification of information placed on motor name plates, greater precision in the dynamic placing of rotors, use of full height keys to avoid rocking and further extension of NEMA standard motor frame sizes to both the larger sizes of a.c. motors and d.c. motors as well. Mr. Alter also pleaded for standardization of presenting catalog information on motors.

Some of the "gripes" presented on controllers included criticism of oversloppiness of control component parts, use of springs that are too weak or ones that readily drop out of place, weak composition arc shields and fragile mounting plates. Absolute reliability of the controller in a compact space demands better compo-

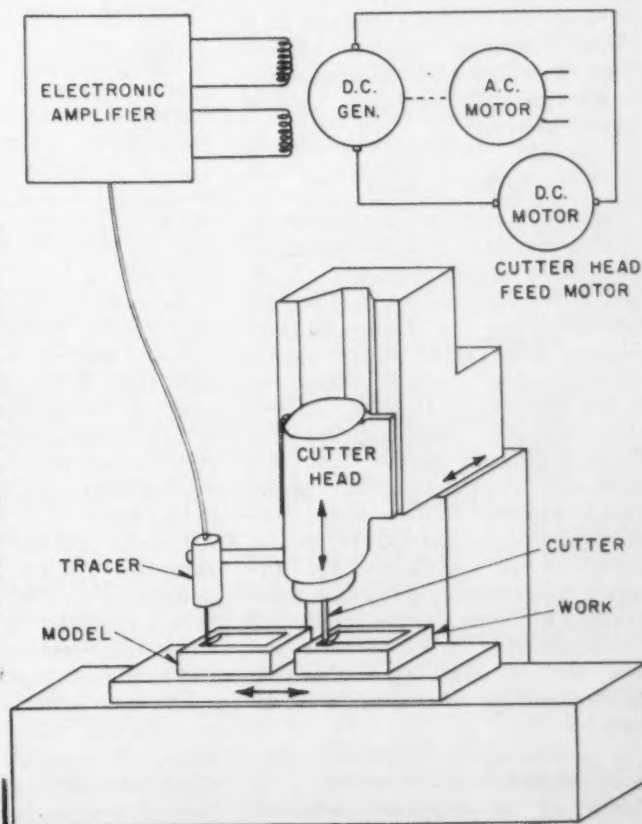
nents, Mr. Alter stated. He also criticized inconsistencies in wiring designations on across-the-line starters.

Commenting on electronic controls, the speaker said prices are out of sight at present and the fittings, which apparently were designed for radios, are too fragile for general shop use. He also said that the over-size motor required to give adequate speed range for a given horsepower was often too big to mount either in or on a machine tool.

Rebuttal

Answering Mr. Alter, W. P. Kelly, Westinghouse motor division, accepted the challenge on fractional horsepower motor standards and indicated that after the war motors would be built to closer tolerances than are dreamed of today. Standardization of flange mountings now under way will conform with the desires of the machine tool industry. The demand of the automobile industry for totally

FIG. 2—Electronic control has been found well suited for exciting the generator field of an M-G set to provide quick response and effective anti-hunting. The sketch shows the application of the scheme to a tracer mechanism in which the d.c. motor drives the vertical feed movement of the cutter head through an infinite speed range in either direction.



enclosed fan cooled motors will be met after the war by use of glass and asbestos insulation to permit higher operating temperatures.

Concentration on production of control equipment for direct war purposes has held back development of industrial devices, according to G. H. Garcelon, manager of Westinghouse control engineering section. He said that fragility of arc shields is a problem, since stronger materials are not good arc barriers. Sloppy fittings are somewhat necessary in control devices since use of close machining would increase the cost and even the size of the unit. The answer is better materials. Similarly, use of stronger springs must be balanced against increasing magnet size and hence greater size of starters. Standardization of wiring of starters is now being studied by NEMA, and Mr. Garcelon predicted that a consistent numbering system for incoming and outgoing terminals would result.

Answering the criticism of high cost of electronic control equipment, Mr. Garcelon indicated that the price will come down in time, as production is increased, but the use of electronic controls was justified on the basis that they provide a means of doing something that can be done in no other way or to do it better. Radio tubes are frequently used because of their availability over special industrial tubes. Incidentally, he indicated that the use of an ignitron tube as an arcless switch in industrial control is out of all reason as to cost and that it was inefficient as a current carrying device besides. These tubes find an ideal application in interrupting resistance welding circuits, however.

To Buy or Build

Relative merits of purchasing or building special control cabinets were discussed by several speakers. E. E. Opel, electrical engineer, National Automatic Tool Co., favors building his own tailor made control panels out of standard starters, relays, etc. He was seconded by D. K. Frost, electrical engineer, Mattison Machine Works, but both agreed that this choice applied only to control panels for a.c. motors. Neither would consider building special panels for d.c. control or for complicated a.c. circuits. Assembling of panels from standard units gives the machine tool builder a wider choice of units and gives closer control of engineering standardization, scheduling and delivery.

In presenting the electrical equipment manufacturer's viewpoint, J. S. Fulton of Westinghouse admitted

that on special jobs engineering costs seem to be higher than those of the machine tool builder, but where quantity production is involved, the control manufacturer can usually beat the cost of any assembled job. Mr. Fulton illustrated typical custom work handled by some 14 local Westinghouse M & R service shops. These small branch plants carry stocks of standard parts, have their own engineering staffs and are equipped to manufacture sheet metal cases to suit individual requirements, also to make last minute changes in factory built control equipment.

Electrical Standards

Several hours were given over to the discussion of the electrical standards recently adopted by General Motors Corp. (THE IRON AGE, May 4, p. 78) and their conflict with certain portions of Machine Tool Electrical Standards, first adopted by the National Machine Tool Builders Association in September, 1941, revised and amplified several times since then and now part of the National Electric Code. R. H. Clark, electrical engineer, the Warner & Swasey Co., and chairman of the committee on electrical problems of the NMTBA, handled this part of the program, after first interpreting the main elements of the standard in chart form so as to render them more understandable and useful to the designer. He indicated, incidentally, that only 17.4 per cent of the machine tool builders have adopted this code thus far.

Regarding the GM specifications, representatives of other automotive companies were in agreement on many points raised. They all wanted type A disconnect switches, for example, capable of being able to interrupt all motors on the machine at 100 per cent load. GM's standard calls for no holes in cabinets, which is in conflict with the NEC provision that control boxes be vented into a space of half the cubical content and that they be provided with a drain hole. In the discussion on this point, it was brought out that this GM restriction was intended chiefly to avoid venting into coolant or lubricating oil sumps where there was fire hazard.

Largest amount of disagreement expressed was over the GM specification that control cabinets be not lower than 2 ft. above the floor, in order to make them accessible for servicing and to prevent them from being damaged by industrial trucks. Few thought that this limitation was necessary. In general, the GM specifications stressed service features and favored oversize units for longer life.

No smaller starter than size 1 will be accepted, for example, nor will the new size rerated NEMA smaller frame sizes. This limitation raises a question, since some motor manufacturers had been using such frame sizes before the reratings (for other makers) went into effect. Stressing accessibility, General Motors prefers motors on the outside of the machine (although it was recalled that the initial demand for motors in leg came from the automotive industry), and where they are installed in a compartment, the space provided must be sufficient to take the next larger NEMA frame size than the recommended horsepower of the machine tool. General Motors is definitely committed to the use of totally enclosed fan cooled motors. If flexible conduit is employed, it must be brazed or welded into the connection and GM will not accept "raceways" for supporting wiring, which should be in rigid conduit, even with the new SN insulated wire.

Summarizing GM's position, a spokesman from the Pontiac division indicated that the electrical specifications were tentative in character and were subject to revision in concert with the electrical committee of the NMTBA, although it was apparent that some conflicts in the two codes would be unavoidable.

More Mechanical Data

More performance and mechanical data on standard motors were asked for by G. B. Carson, director of research, Cleveland Automatic Machine Co., who discussed electrical equipment for automatic machinery. Often in the design of a machine tool, the inertia forces of the motor must be taken into account, particularly where frequent reversing is encountered. Mr. Carson indicated that few companies were in a position to supply WR^2 values for the motor rotor and expressed surprise at the wide variations obtained for standard motors of the same size, amounting to as much as 24 per cent.

In connection with the specific problem in adapting motors to reversing duty, Mr. Carson found that no motor manufacturer was in a position to state how many reversals with a given external WR^2 load, a motor could make without overheating, how long it would take for standard motors to reverse from full forward to full reverse and how many revolutions a motor would make in that period. His company was forced to develop this data in its own laboratory.

The speaker also criticized the temperature rating of motors, based on

40 to 50 deg. C. rise above "ambient," since in a closed machine base the ambient temperature might be 66 deg. C. or higher. He showed charts to indicate that temperature ratings taken on the stator coils varied widely, depending upon the point at which the thermocouple was inserted. Some points in the stator may run up to as high as 150 deg. C.

Cleveland Automatic Machine Co. has made a study of the ventilation of electric motors and has reached the conclusion that single end ventilation was more effective than double end ventilation, particularly when the motor is placed in an enclosure where recirculation of air becomes a real problem. A motor end bell of the so-called half-moon type with bottom entry for the air produces the best results from the standpoint of motor cooling. Expanded metal grilles were found more effective than cast louvers and the use of baffles did much to prevent recirculation of heated air within an enclosure. Much cooler operation also results by the application of a duct leading from the rear of the motor to the grille of the enclosure, in the case of single flow ventilation. In one specific instance the addition of a duct resulted in a reduction of motor temperature of 13.5 per cent compared with the next best condition. Mr. Carson concluded that much could be gained by more efficient motor blower design.

Carbide Steel Milling

Experimental work on milling of steel indicates that the cutting forces necessary to remove metal with negative angle cutters are 15 to 20 per cent higher than in ordinary practice and since the peripheral speeds are five to ten times higher than those employed with high speed steel cutters horsepower consumption is increased proportionally, according to H. A. Frommelt, director of research, Kearney & Trecker Corp. He illustrated in chart form results of tests made on a number of negative angle milling jobs.

The necessity for restricting horsepower consumption to within reasonable limits has led to the use of coarse pitch cutters in order to maintain a high chip load, high peripheral speed and high feed rate. Because of the use of coarse pitch cutters, flywheel effect is essential to reduce impact. Attempts to build such effect in cutter bodies, however, is not considered good design or effective in the elimination of undesirable impact loads. Mr. Frommelt suggested the use of flywheels on the cutter arbor or built into the machine spindle. He indicated, however, that definite and spe-

cific results of flywheel effect will come only from much more experimental data than is now available.

Considerable experimental work also remains to be done regarding optimum angles. Present indications point to the advantageous use of a combination of 7 deg. negative rake and 7 deg. negative helix for general milling purpose in face and half side milling operations. In slotting, results obtained over long production periods indicate that a 0 deg. helix angle and a 15 deg. negative rake represent an effective combination in the milling of difficult pieces. Mr. Frommelt also recommended the use of solid wedged carbide blanks rather than brazing the blanks in the cutter bodies. Cutter life has been increased by as much as 200 to 300 per cent through the use of mechanically held blanks.

Several other speakers confirmed the necessity of using flywheels. All stressed the fact that the flywheels should be mounted as near to the cutter as possible in order to avoid torsional vibration. There was some disagreement as to the optimum bevel angle to be used on face milling cutters but all agreed that the bevel angle influences the true rake angle of the tool in the direction of chip flow.

Philip M. McKenna, president of Kennametal, Inc., urged the use of mechanically held carbide tips and indicated that his company was prepared to furnish blanks with countersunk holes, enabling them to be screwed directly on to the shank, although blanks with 7 deg. wedge angles are also obtainable.

Future of Industry

Revision of the corporate tax structure, real collective bargaining between labor unions and industry groups rather than individual manufacturers, stabilization of employment and ameliorization of the violent swings in the business cycle, particularly in the machine tool industry, were among a few suggestions made by Frederick S. Blackall, Jr., president, Taft-Peirce Mfg. Co., in reviewing postwar economic problems. Speaking at the closing banquet, Mr. Blackall stated that there are elements of optimism and promise in the postwar situation since there has never been a time when business men have been more conscious of the character of their problems or more fired with a resolve to do something about them than they are today. There is a genuine determination on the part of business to maintain higher levels of employment and to reduce the swings.

The speaker saw the makings of the greatest peacetime boom in history in that, coupled with the dearth of consumer goods resulting from wartime restrictions, there is the greatest reservoir of unspent purchasing power which has ever existed in this country.

The machine tool industry's main problem is in creating obsolescence through constant product improvement and in convincing industry of the essential need of a regular machinery replacement policy. In this connection, Mr. Blackall urged an active promotional program on the part of the machine tool industry to induce manufacturers to eliminate old or obsolete machine tools through the annual expenditure of their entire depreciation reserves, plus a substantial appropriation from profits in good years. If the industry could prevail upon manufacturers to put such reserves into a separate bank account and pay for its machinery purchases out of this account, the machine tool industry would go a long way in assuring its future. The trouble is, he said, that many managements fail to recognize depreciation except as an entry on a balance sheet, and often the money is distributed as dividends.

Speaking of postwar possibilities for Westinghouse, F. D. Newbury, vice-president, said that the best overall guess of postwar sales is roughly 60 per cent of 1944 peak billings. Although, this might appear low, he asserted that actually it represents 175 per cent of the maximum prewar billings. Once consumer durable goods industries, like automobiles and refrigerators, have passed the difficult period of reconversion, Mr. Newbury believes they will be able to provide employment for all or more than those employed during the war. Plants engaged in the manufacture of heavy industrial machinery, machine tools and power plant equipment, however, will undoubtedly reduce the number of employees, average weekly hours and the extent of multiple shift operation. One of Westinghouse's heavy machinery divisions, for example, expects a reduction in employment from 11,000 to 3000 persons.

Mr. Newbury placed great emphasis on the postwar price structure, which he expects to be high. Automobiles and other consumer capital goods, if manufactured today would cost 20 to 30 per cent higher than in the prewar period, largely because of higher labor rates. He urged manufacturers to place the problem of reducing operating costs at the top of their thinking.

New Equipment . . .

Machine Tools

. . . New designs and improvements in tool room and production equipment are described and illustrated in the following pages.

HYDROMATIC milling machines equipped with automatic, hydraulic tracer control, which automatically reproduces the contour of a master profile template on the workpiece within exceedingly close limits, are announced by *Cincinnati Milling & Grinding Machines, Inc.*, Cincinnati. They are built in a wide variety of sizes in plain or duplex style. The automatic, hydraulic tracer mechanism, mounted on the spindle carrier, controls the vertical position of the spindle carrier during the cutting stroke of the table. A roller on the end of the tracer mechanism engages the master profile template attached to the work holding fixture. As the table moves, the roller moves along the top of the template and any vertical movements of the tracer valve, imparted by the roller, are automatically duplicated in magnitude by the spindle carrier. An automatic variable feed attachment is available which provides automatic, cam-controlled variations in feed rate to permit constant maximum metal removal regardless of variations in the width and depth of cut. Table feeds are hydraulic and are infinitely variable under the control of a single throttle-type lever. All castings are of Mee-

hanite metal. Chips fall away freely through recessed openings in the top of the bed and there is a spacious chip compartment in the bed itself.

Centerless Grinding Machine

ON the No. 12 centerless grinding machine announced by the *Landis Tool Co.*, Waynesboro, Pa., the regulating wheel base is completely self-contained, drive to the spindle being from an adjustable motor through multiple V-belts. One of the outstanding features is that the regulating wheel is dressed by traversing

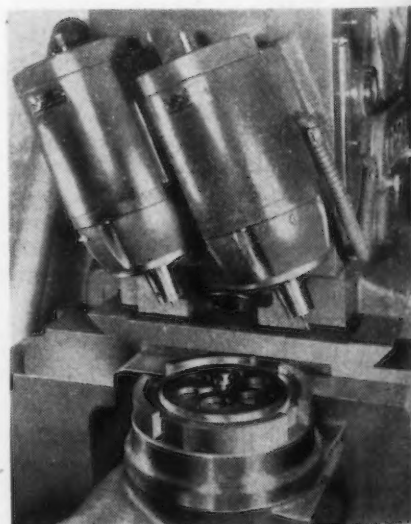
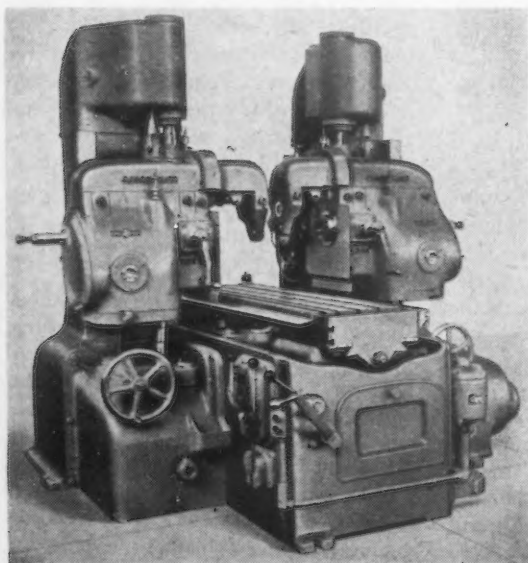
ing of tapers. The grinding wheel base is also completely self-contained, with the drive through multiple V-belts to the grinding wheel spindle. "Microsphere" wheel spindle bearings are used for both grinding wheel spindle and regulating wheel spindle. A large grinding wheel feed handwheel with a micrometer dial makes possible feed settings in tenths.

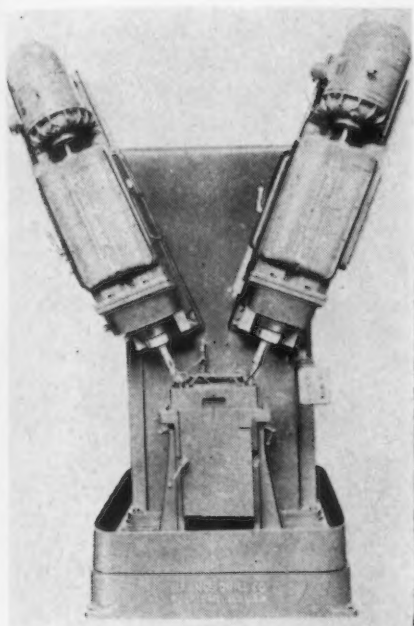
Special Milling Machine

TO mill notches on each side of 12 drilled holes in a retainer ring, the *Cross Co.*, 3250 Bellevue Avenue, Detroit 7, recently developed a special milling machine for an aircraft engine manufacturer. The machine is equipped with a rotary table which indexes automatically as the cutters are retracted vertically upward after each cutting operation. Duplex cutter spindles and slides are mounted in a fixed angular position on a vertical slide. Shell motors are in self-contained spindle heads and the cutter spindles serve as motor shafts. Power traverse automatically retracts the column to clear the rotary table for loading.



the entire wheel base across the point of a positively held diamond. This is done hydraulically, although screw feed is also provided for quick axial alinement of the regulating wheel. Control of this wheel dressing motion as well as the hydraulically fed diamond dresser for the grinding wheel is from a central panel which also provides for increasing the regulating wheel speed when dressing. The hydraulically operated cross slide provides a means for accurately aligning the work rest blades. The regulating wheel base may be swiveled for the grind-



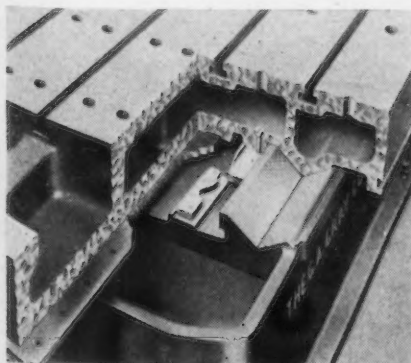


Drilling Units

A UNIT which can be arranged for drilling, reaming, facing, boring, counter-boring or tapping operations in any one or combination of horizontal, vertical or angular positions has been developed by the *Barnes Drill Co.*, 814-30 Chestnut Street, Rockford, Ill. The Nos. 10 and 20 units have the essential working parts built in complete with a single motor, driving the spindle rotations and hydraulic pump for any automatic hydraulic feed cycle. No. 5 unit is equipped with a separate motor driven hydraulic system. Rapid approach, variable feed and quick return are given. Maximum, uninterrupted production can be obtained with the use of a Barnesdril automatic indexing table with a spare loading station and a hydraulic decelerated control for positioning the table.

Planer Table Safety Stop

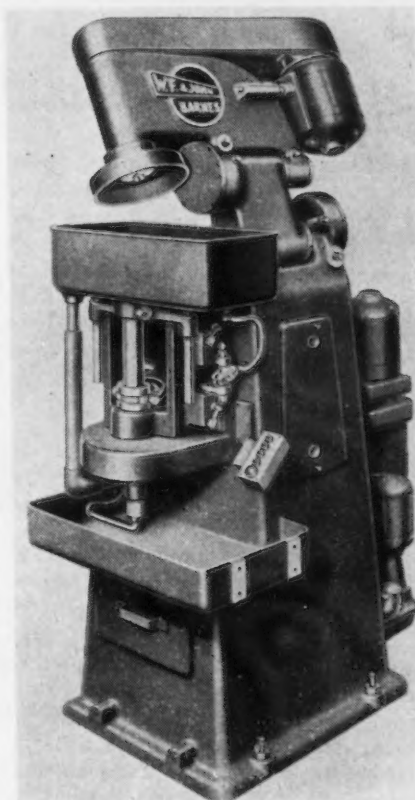
A DEVICE for stopping a runaway planer table after it has run off the bull gear and is out of control is now a regular feature of plan-



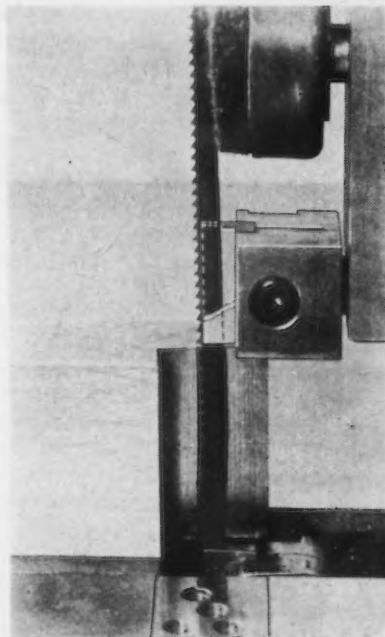
ers built by the *G. A. Gray Co.*, 3511 Woodburn Avenue, Cincinnati 7. The safety stop consists of cutting tools bolted to the bed at each end, adapted to engage stop blocks bolted to the underside of the table. The table is brought to rest by the tools cutting into the stop block. The tools do not engage the block until the table rack has run off the bull gear. The tools are arranged so cutting action occurs on the side of the block, avoiding upward thrust which might otherwise cause the table to lift and thereby damage the ways.

Optical Curve Generator

THE Model 4 optical curve generator introduced by *W. F. and John Barnes Co.*, Rockford, Ill., is a precision machine, equipped with a



special hydraulically actuated system for automatic cycle operation. The proper curvature is obtained by two angular adjustments of the top spindle arm plus a differential screw micro-adjustment incorporated in the spindle itself. The machine can be used either singly with one all-purpose grit diamond tool or a battery of two or more machines may be used wherein the first machine is equipped with a coarse grit diamond tool that will quickly rough grind to approximate size and curve and the second machine equipped with a fine grit diamond wheel for finish grinding of the lens.

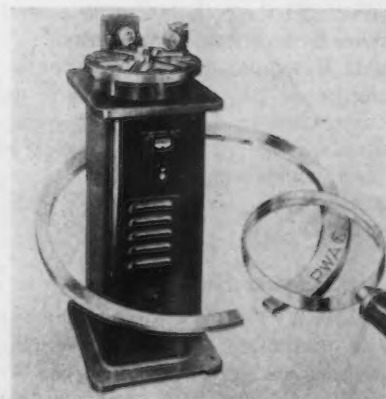


Self-Seating Saw Guide

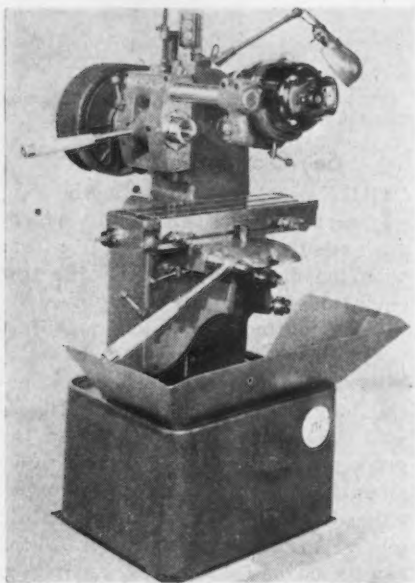
THE problem of providing bearing surfaces with an almost indefinite number of shapes to conform with the distorted shape of the saw blade under load has been solved by the self-seating saw guides manufactured by *Grob Brothers*, Grafton, Wis. The guides are made from special tough aluminum bronze of Rockwell C-34 hardness. Long life of the guide is assured by a felt oiler mounted directly above the upper guide. The effect of the self-seating guides permits heavier pressure to the saw blade and minimizes destruction of the blade from the rear. Greater accuracy in sawing is permitted and there is close support immediately above and below the work. Change-over for various width saw blades is quick and easy.

Marking Machine

A SEMI-SPECIAL power-operated dial feed high-speed precision marking machine which was designed for marking a trademark, part num-



ber or other identification permanently into piston rings up to 6 in. in diameter has been developed by the *Noble & Westbrook Mfg. Co.*, Westbrook Street, East Hartford, Conn. The main work carrying dial is mounted on a vertical shaft which is driven by a built-in worm drive unit running continuously in a bath of oil. It has six loading stations. The marking die mounted at the back of the machine is on a spindle which is geared to the dial and the revolutions are timed so that the marking die marks in the same relative location on each piston ring. Production of approximately 40 to 60 per min. is obtained.



Hand Miller

A NEW model of milling machine is announced by W. H. Nichols and Sons through their distributors, *Nichols-Morris Corp.*, 30 Church Street, New York. All tooling and attachments between new and old models may be interchanged. A large capacity coolant tank and motor pump compose an independent unit built into the base. The cutter can be presented to the work or vice versa, and the spindle can be securely locked in any stage of the travel. The table is available with work surface lengths of 21 or 30 in. Rack and pinion transverse feed can be substituted for the regular transverse feed screw, which permits precision boring, facing, recessing and profiling operations.

Diamond Finishing Grinder

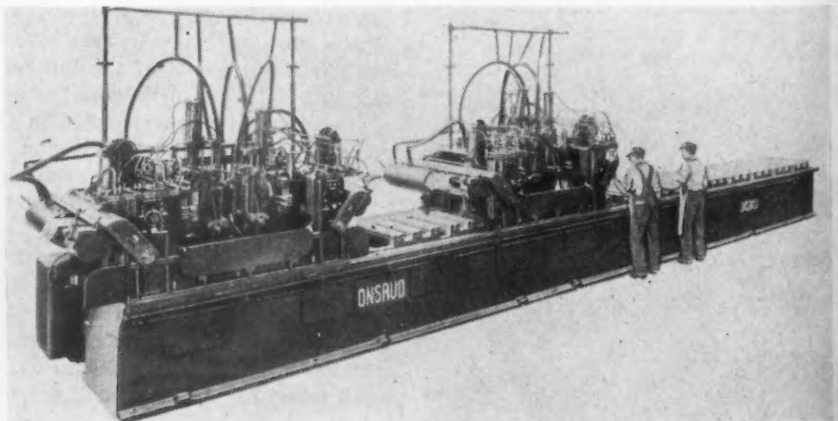
A HEAVY-DUTY chip breaker and diamond finishing grinder has been announced by *Hammond Machinery Builders, Inc.*, 1612 Douglas



Avenue, Kalamazoo 54, Mich. Model CB-76 is designed for accurately grinding chip breaker grooves and for precision finishing of all single point carbide tipped tools requiring nite number of shapes to conform angle vise, universally adjustable, will handle all types of box and single point tools up to 2 in. The diamond finishing grinding side is designed for use of either a 6 or 7-in. diameter cup wheel.

Contour Miller

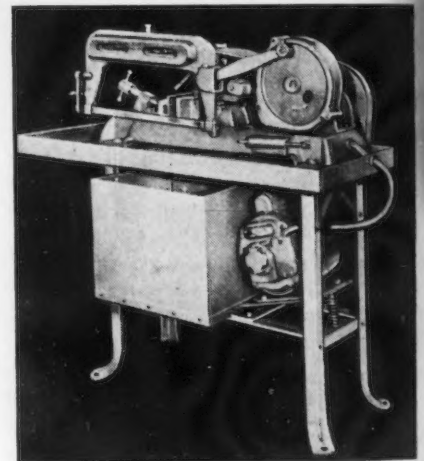
AN automatic contour miller marketed by the *Onsrud Machine Works, Inc.*, 3945 Palmer Street, Chicago 47, features the use of high r.p.m. cutters and fast feed; pattern control of cutter travel; automatic cam bar feed control and a method of bringing cutter heads to the work by means of a movable carriage and pneumatic hold-down pressures. The



A80-A employs eight cutter heads, mounted on two carriages, to automatically mill long, nonferrous aircraft parts, such as spar channel beams and cap strips. Each carriage mounts two vertical and two horizontal cutters and all eight cutters may be used at one time. Cutter motor speeds go as high as 10,800 r.p.m., providing lineal cutter velocities of from 5000 to 8000 ft. per min. The eight motors are normally rated at 180 hp., but are capable of 100 per cent overload.

Power Hacksaw

THE Excel power hacksaw is made in both floor and bench models for either wet or dry sawing by the *Covel Mfg. Co.*, Benton Harbor, Mich. It will handle any work up to 4-in. square stock and the desired cut



can be made at any angle up to 45 deg. Aluminum, bakelite, fiber, cast iron, etc., may be cut at the rate of 80 strokes per min. Annealed tool steel, alloy, machine steel, etc., may be cut at the rate of 60 strokes per min., and hard materials such as spring steel at the rate of 40 strokes per min.

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Oilgear generator or pump powering three accelerators that actuate molding presses. Many processes have used this successful Oilgear technique for years and with entire satisfaction.

Putting a Punch in Plastics

Oilgear Made Idle Seconds Do the Work of Dollars

If the new machine or process you are developing has idle moments in its recurrent work cycle, take a tip from Phoenix. The Phoenix Metal Cap Company of Chicago operates a battery of plastic molding presses. These presses require no power at all during the charging periods, so Oilgear engineers saw a way to reduce costs. Instead of the big drive that would normally be required, they installed one small, highly efficient Oilgear Fluid Power generator... and for each press, a single air-accelerator. The Oilgear system works while the presses rest... *building up in the accelerators the tremendous power required for the molding operation.* The saving

in initial drive investment was immense, power consumption was reduced.

This is just another highlight in the story of Oilgear versatility which with Oilgear engineering experience is solving problems up and down the land—machine design puzzles solved by means of the tremendous force in small space... the force without motion... the steplessly variable speeds... the combination of linear and rotary motion... or any of the other functions Oilgear provides. Oilgear may be a "natural" for you. Why don't you find out? Now is the time... **THE OILGEAR COMPANY,** 1303 West Bruce Street, Milwaukee 4, Wisconsin.

ARE YOU TRYING TO:

1. Apply large forces through long... or short... strokes at variable speeds?
2. Obtain automatic work cycles, variable speeds in either direction... with or without pre-set time dwell?
3. Apply large forces through continuous or intermittent reciprocating cycles at constant or variable velocities?
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7. Apply light... or heavy... forces at extremely high velocities through either long or short distances of travel?
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12. Obtain accurately matched speed of various rotating elements?
13. Obtain constant speed output from a variable speed input?
14. Obtain full pre-set automatic control, elimination of problems of shock, vibration, etc.?

You Need Oilgear!

OILGEAR

Fluid Power

Assembly Line . . .

STANLEY H. BRAMS

• Detroit is pockmarked by strikes in 18 plants, the most significant being walkouts of foremen who appeared to be setting up a full-scale campaign for bargaining recognition.



DETROIT—In the spring a worker's fancy lightly turns to thoughts of strikes. So it seemed in Detroit during the first week of May, when industrial tieups spread over the industrial landscape with the surprising rapidity of Naval moves in the Pacific.

If anything, the wave of May strikes proved a set of simple facts—psychological, physiological and practical. Psychologically, the emotional disturbances of the war undoubtedly played a part in the general disregard of authority, just as they have played parts in other spheres of our social scene. Physiologically, the strikes came with the warm weather. As has regularly happened in Detroit in recent years, the first season's heat starts up irritations. Practically, they represented end points of various dissatisfactions, such as WLB policies and continued factionalism within the United Automobile Workers' Union.

The most significant share of the Detroit strikes of last week revolves around the moves taken by the Foremen's Association of America, an independent union, to establish a bargaining place for itself over the opposition of management, the WLB and the NLRB. Of 18 plants whose workers struck during the first week in May, 11 were affected by foremen's walkouts.

The F.A.A. has had a beleaguered life of about 18 months. Organized first at Ford Motor Co. late in 1942,

it signed a contract with the company in February, 1943, and simultaneously began to grow, primarily in Detroit. It won an NLRB election a month later at Packard, and moved out in search of further victories.

This union stubbed its toe when it invaded certain General Motors plants. G.M. went promptly to Washington, appealing to Congress in March, 1943, for action to establish that organizing of supervisory help was not contemplated in the intent of the Wagner Labor Relations Act. But clarification or legislation proved unnecessary. In May, 1943, NLRB ruled in the Maryland Drydock Co. case that foremen were management representatives, exempt from the Wagner Act provisions.

This was a body blow to the F.A.A., but not a fatal one. While gathering breath, it quietly continued organizational work, insisting meanwhile that it had a right to bargain collectively and to strike. There were a few walkouts later last year, but none of major consequence.

The fruit of the quiet organizing bloomed in Detroit last week when 11 plants of Briggs, Hudson, Murray and Packard found their foremen on strike. There were various reasons, perhaps pretexts rather than reasons, but the basic issue was plain and simple: Recognition.

SOME plants have brought this headache on themselves. Foremen in such plants, as they have themselves proclaimed, have truly become the forgotten men of industry. They have been unable to enforce discipline of union stewards and committeemen, and later of the workers those union officials protected, because the managements found it more expedient, in such apparently petty conflict with the union, to give in. At the same time, the foremen have been badgered by their superintendents and plant managers for failures to maintain production levels made impossible by the laxness of the discipline they were able to maintain. They were right in the middle, sniped at by all sides.

They had other complaints, too. Many of them found their salaries during the ebullient war years shrinking to less than the pay earned by many skilled workers under their jurisdiction. This, of course, was an incipient point of dissatisfaction.

On the management side of the dispute is the obvious fact that somewhere there has to be maintained a link between front offices and workers. The foremen are that link today. If they organize, their attitude inevitably changes: they become a force opposed to the management they represent. It was on such grounds that NLRB refused to grant bargaining rights to petitioning supervisors in the Maryland Drydock case.

Quite evidently, the F.A.A. has determined that this shall be the showdown battle for recognition. If they win it, management may counter by using most of the foremen as job setters rather than shop administrators, and turning that burden over to a larger number of superintendents, for areas as well as plants. Whether this would solve the problem remains to be seen. For, if basic problems remain, the superintendents might become organization-minded themselves.

The F.A.A. drive was definitely the most significant development last week in Detroit, but the other strikes were important, too. Still, the reasons for the simultaneous tieups at scattered points were obscure.

There was a good deal of general thinking, in labor circles as well as in management, that one major explanation was psychological, as simple as it was deep-seated. These interpreters looked on the strikes as evidences of the breakdown of barriers induced by the war—in this case, breakdown of the barriers of respect for authority.

Certainly this factor of strain and unconscious emotional disturbance caused by the war is everywhere present. No one is removed from the war. He is earning more money, finding food and gasoline rationed, worrying about relatives on the fronts, riding in more crowded street cars, complaining about higher prices, perplexed by Washington. The neuroses set up are certainly as powerful as they are hard to isolate. Add to that the imitative factor, and there exists a perfectly logical formula for a strike outbreak like last week's.

ONE tieup, however, had distinguishing characteristics. For that reason thoughtful Detroit eyes turned to look south across the river to Windsor, where operations of Ford Motor Co. of Canada were paralyzed by a second walkout two days after

HOW TO MAKE AN I.D. CHECK *without touching the surface*



This Pratt & Whitney Air-O-Limit Internal Comparator avoids actual contact . . . eliminates danger of scratches or marrings of fine finished surfaces . . . gives instant, accurate readings that split "tenths" . . . speeds up I.D. inspection rate.

• • •

It was a tough problem. An airplane engine manufacturer needed a safe, sure way to inspect the critical I.D. of master-rod bearings. Ordinary gaging methods would touch the soft lead-indium plated inner surface . . . produce scratches that would spoil it for use.

The manufacturer asked Pratt & Whitney engineers, "Have you the answer?"

"No, but we'll find one." Result: the Air-O-Limit Internal Comparator . . . extremely simple in construction and operation . . . but it took the accumulated years of P&W "know-how" and experience and skill to produce it quickly.

Here's how it works. The bearing to be inspected is

placed on a sliding V-block mounting and slipped over the gaging spindle . . . there is a slight clearance so that *it does not actually touch*. This spindle has two tiny opposite nozzles through which compressed air is forced. The amount of back pressure caused by limiting the discharge of air through the nozzles is registered on a precision pressure indicator calibrated to read in ten-thousandths of an inch. Size, roundness, and taper are unerringly recorded.

This is the highly successful Air-O-Limit Bearing Gage. Other Air-O-Limit models use the same "air principle" but omit the non-touching feature. The piece slips on the spindle and rests on a chrome-plated surface. Hundreds of this type are at work inspecting fine tolerance parts. They require practically no up-keep or servicing . . . are designed for long wear.

One more typical Pratt & Whitney contribution to the speeding up of America's mighty war production . . . one more contribution to peacetime mass production. Ask for information.



PRATT & WHITNEY

Division Niles-Bement-Pond Company

WEST HARTFORD, CONNECTICUT, U.S.A.

the first was ended. The new strike grew out of union claims that grievance procedure agreed on as a settlement plank in the first tieup was being disregarded. Shop committeemen still had to have permission from supervisors to take time to adjust grievances, said the UAW, and permission was rarely forthcoming.

This strike quickly turned into a battle royal. Mayor Rheaume of Windsor sided steadily with the strikers. The strikers charged the Dominion Wartime Labor Relations Board with "double-crossing." The UAW officials pleaded with the men to go back to work, pointing out the opprobrium which would attach to the strikers if they were idle when invasion began. The company maintained the whole walkout is illegal and called for Royal Mounted Police to open plant gates for workers who want to return to their machines.

In midst of all this, the UAW ex-

ecutive board was meeting at Minneapolis, trying to transact board business between interruptory phone calls carrying tidings of further strikes. It was hardly a time for peaceful contemplation of the scene.

The board did indicate that its next objective is an annual wage for workers. This has been a long-term objective of the auto workers, but seems likely to stumble again, as it has before, on the inability of companies to foresee an annual market. As long as auto industry plants have to schedule production from month to month, with output and employment based on sales, it does appear impossible to guarantee workers their jobs for fixed periods.

That is the picture of Detroit as it makes the turn toward summer. It still doesn't know whether it's on a steep downgrade of its labor roller coaster, or simply making a sharp turn. In any case, it's holding its hat.

Distribution Planned For New Tool Designs

Washington

• • • To permit the showing of newly developed labor saving types of machine tools, the WPB Tools Division may soon inaugurate a policy of allowing manufacturers to ship not more than 10 tools of all types and sizes to distributors either on a sale or consignment basis, provided the manufacturers have filled their rated orders. This action will be taken to permit a return to normal trade practices where possible without interference with war production. Tool Division officials say that the action would aid smaller producers who are now generally the only ones desiring to continue placing machine tools in dealer's stocks, but such tools cannot be sold on preference ratings.

By-Product Coke Industry Holds Lowest Stocks Since Beginning of War

Pittsburgh

• • • By-product coke plants entered 1944 with one of the smallest supplies of coke since the war began. Absenteeism, strikes, and waning efficiency per man per ton during the past year or so, contributed to a marked decline in the number of days' supply. The unusual operations in the nation's blast furnaces also served to accentuate the coal shortage problem.

In February of this year, by-product coke plants throughout the country had only 24 days' supply of coal ahead of their operations. It is expected

that March figures will indicate the same condition. This is in marked contrast with February, 1942, when the supplies on hand represented 33 days, and in February, 1943, when by-product plants had 39 days' supply.

While observers do not expect that by-product ovens will be forced to shut down this year because of coal shortages, they do look for one of the tightest supply situations since Pearl Harbor. While there appears to be no threat of widespread strikes in 1944 at the coal mines, other factors are said to be affecting production.

Drafting of men into the armed services, the previous loss of miners to better paying war jobs, the higher rate of absenteeism among miners, and the drop in individual efficiency, have all contributed to making 1944 a difficult year.

Bureau of Mines figures indicate in December, 1942, by-product coke ovens had stocks on hand amounting to close to 11,000,000 tons. In 1943, December figures indicated only 6,300,000 tons on hand. Consumption in December, 1943, despite the drop in supplies, was slightly greater than in December, 1942. This trend of increased or continuing consumption, coupled with a slow but steady decline in supplies, is expected to continue throughout 1944. The significant conclusion, drawn from the Bureau of Mines figures, is that the by-product coke industry, which for the most part furnishes the fuel to make pig iron, and, hence, governs steel ingot output, cannot stand any unusual work stoppage or any substantial pick-up in demand. This is indicated by the fact that latest reports show only 24 days' supply of coal ahead of by-product ovens. This is on an aggregate basis and does not disclose the geographical position of by-product coke supplies. While the steel industry was expected to get through this year without serious coal shortages, it is believed that such a situation probably can only be realized by strict distribution or, possibly, curtailment of distribution to nonessential endeavor.

Stocks, Consumption & Days' Supply of Coal at By-Product Coke Plants

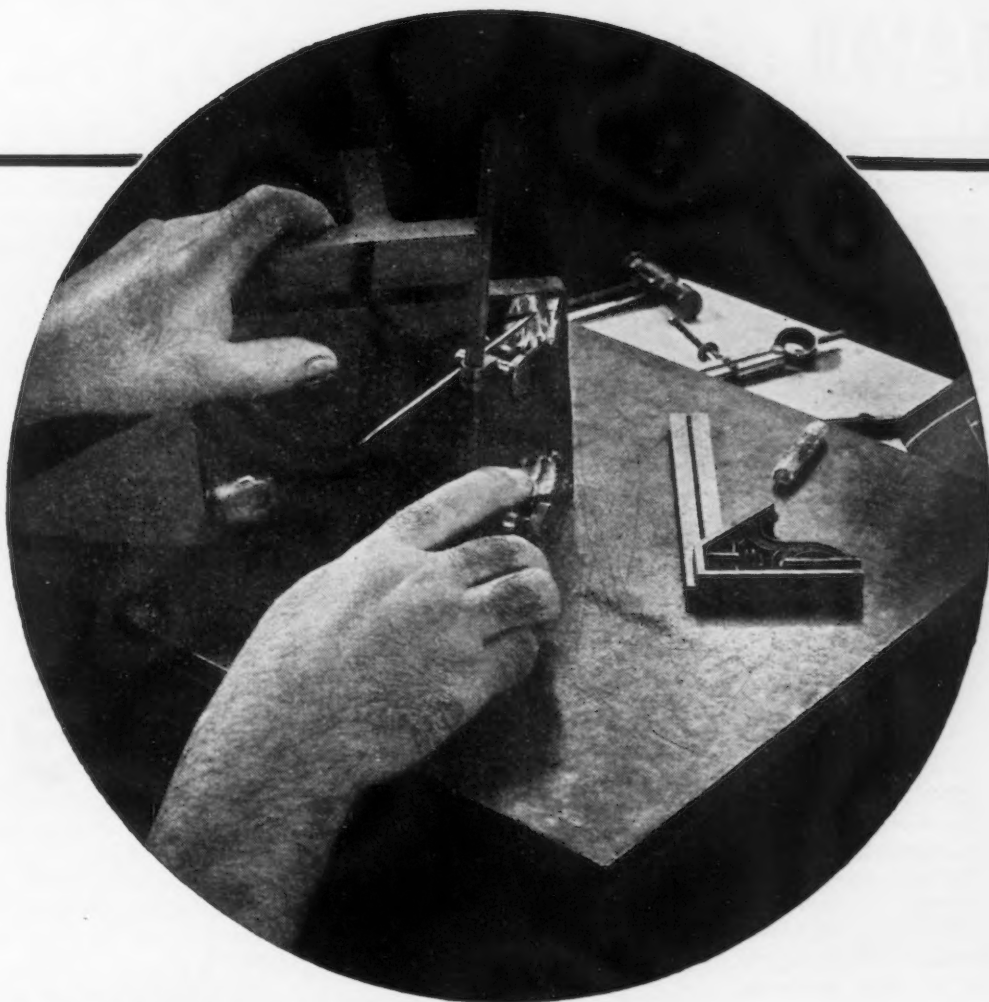
Net Tons. 000 Omitted.
1942-1944

Source: Bureau of Mines. Compilation: THE IRON AGE.

BY PRODUCT OVENS

Month	Stocks, End of Month			Consumption			Days' Supply		
	1944	1943	1942	1944	1943	1942	1944	1943	1942
January	6162	9958	8179	8022	7582	7404	24	40	34
February	6383	9778	7888	7583	6965	6685	24	39	33
March	6281*	9851	7881	8124*	7647	7372	24*	40	33
April		9732	8409		7494	7173		39	35
May		9219	9179		7666	7451		37	38
June		7143	9866		7185	7229		30	41
July		6819	9922		7491	7504		28	41
August		6811	10238		7768	7508		27	42
September		8591	10566		7609	7294		26	43
October		6657	10998		7707	7542		27	45
November		5820	11151		7325	7334		24	46
December		6306	10721		7668	7583		25	44

*Preliminary



RE-EXAMINE your tooling now for cost reduction

PRODUCTION COSTS CAN BE CUT WHEN A TOOL STEEL FULLY MEETS SPECIFIC REQUIREMENTS

The urgent need for speed in wartime tooling has compelled many toolrooms to accept compromises in materials and methods. As a result, short tool life, hardening difficulties, and too frequent regrinds have affected costs and tool performance.

With the initial tooling-up job well in hand in many plants, now is a good time to smooth out some of these wartime tooling problems and look for ways of reducing costs and improving performance.

Check over the specific requirements of each job. See which of the following properties are needed to provide longer tool life—higher output with fewer regrinds—lower tool cost:

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Re-examine your tooling program now. Find out how this matched set method can help you cut costs and increase profits. If you are responsible for tooling or tool production write today on your company letterhead for a copy of the Carpenter Matched Tool Steel Manual. (Free to tool steel users in the U. S. A.)

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TOOL STEELS



Washington . . .

L. W. MOFFETT

• **Congressmen scramble to get a rule for first consideration of termination bills introduced. . . . SWPC policy may undermine Maverick's stand against cartels.**



WASHINGTON — While the Murray - George (Senate) contract cancellation bill has been attacked by organized labor, there is a mad scramble in the House to get a rule for first consideration of termination bills introduced by Representative Andrew J. May, democrat of Kentucky and chairman of the Military Affairs Committee, and Representative Carl Vinson, democrat of Georgia, chairman of the Naval Affairs Committee. (The Senate by unanimous vote passed the Murray-George war contract bill May 4 and sent it to the House.)

The Rules Committee has been unable so far to break the deadlock since both members are adamant. Mr. May says that they will have to take or leave his bill. Mr. Vinson says that the Committee is bound to give his bill first consideration because, while the favorable report of the Naval Affairs Committee on the bill was 19 to 2, the May bill was introduced after a Military Affairs Committee dead-heat vote of 13 to 13.

Meanwhile, Representative Estes Kefauver, democrat of Tennessee, is expected to introduce soon a version of the Murray-George bill, which minimizes the duties of the Comptroller General to the investigation of fraud. The Vinson and May bills both give the Comptroller General considerable authority in the final settlement of termination claims.

The General Accounting Office squabble will be taken up first by the Senate where proponents of the Murray-George bill have a good chance of winning out, but in the House, Com-

troller General Warren, who is a former member from North Carolina, has enough influence to start a floor fight which he will win. The Accounting Office battle which the Baruch report took notice of by saying too much GAO would "audit us into a panic" through undue delays in making settlements final, will have to be fought out between the two houses.

THE CIO President Philip Murray, AFL President William Green, and Railway Labor Association Secretary Julius Luhrsen sent an open letter to the Senate demanding that the human side of demobilization be given equal emphasis and precedence with property legislation.

"We especially regret the voting out at this time by the Senate Military Affairs Committee of the Murray-George Contract Termination bill (S-1718) divorced from legislation dealing with the human side of demobilization and without any adequate hearings on so serious a problem," labor men said.

The letter urged: "Emergency unemployment compensation for demobilized workers and servicemen in the reconversion period is an indispensable part of the overall legislation and should not be side-tracked to another committee for separate consideration."

The upshot of all this, Congressmen are predicting, is an all out credit-seeking amendment-fest possibly by both houses, with delays so serious that the legislation won't be passed until after elections in the fall. Of course, should Germany surrender before election, pressure for legislation would be so great that petty quarrels would have to be forgotten, and a bill would be jammed through.

• The labor leaders reminded Congress that they represent 12,000,000 workers and claimed to have 3,000,000 in the Armed Services. Congressional sources think that the plea will fasten attention on the need for social legislation in the adjustment period, but that it will not kill off termination legislation.

• One interesting angle of the labor letter is that Philip Murray implied that he is giving up his demand of the guaranteed wage now before WLB through being signatory to a letter which proposes emergency un-

employment compensation. If Congress enacts legislation, giving federal assistance to states for increased unemployment compensation, labor's drive for dismissal wages or a guaranteed annual wage fall of themselves.

* * *

• **Smaller War Plants Corp.** will make loans after the war to small business, and some of these loans may not be the type that a private banker would be interested in because of inadequate security. Normally, marginal war businesses could be expected to sink or swim according to the skill of their management and the aggressiveness of their efforts, but it looks as though under SWPC future policy the paternalism of the New Deal will be continued.

* * *

• **Maury Maverick**, SWPC head, is opposed to cartels and in favor of "free enterprise," and yet if SWPC undertakes to prevent all small business failure, an element of the cartel theory will have been adopted by WPB.

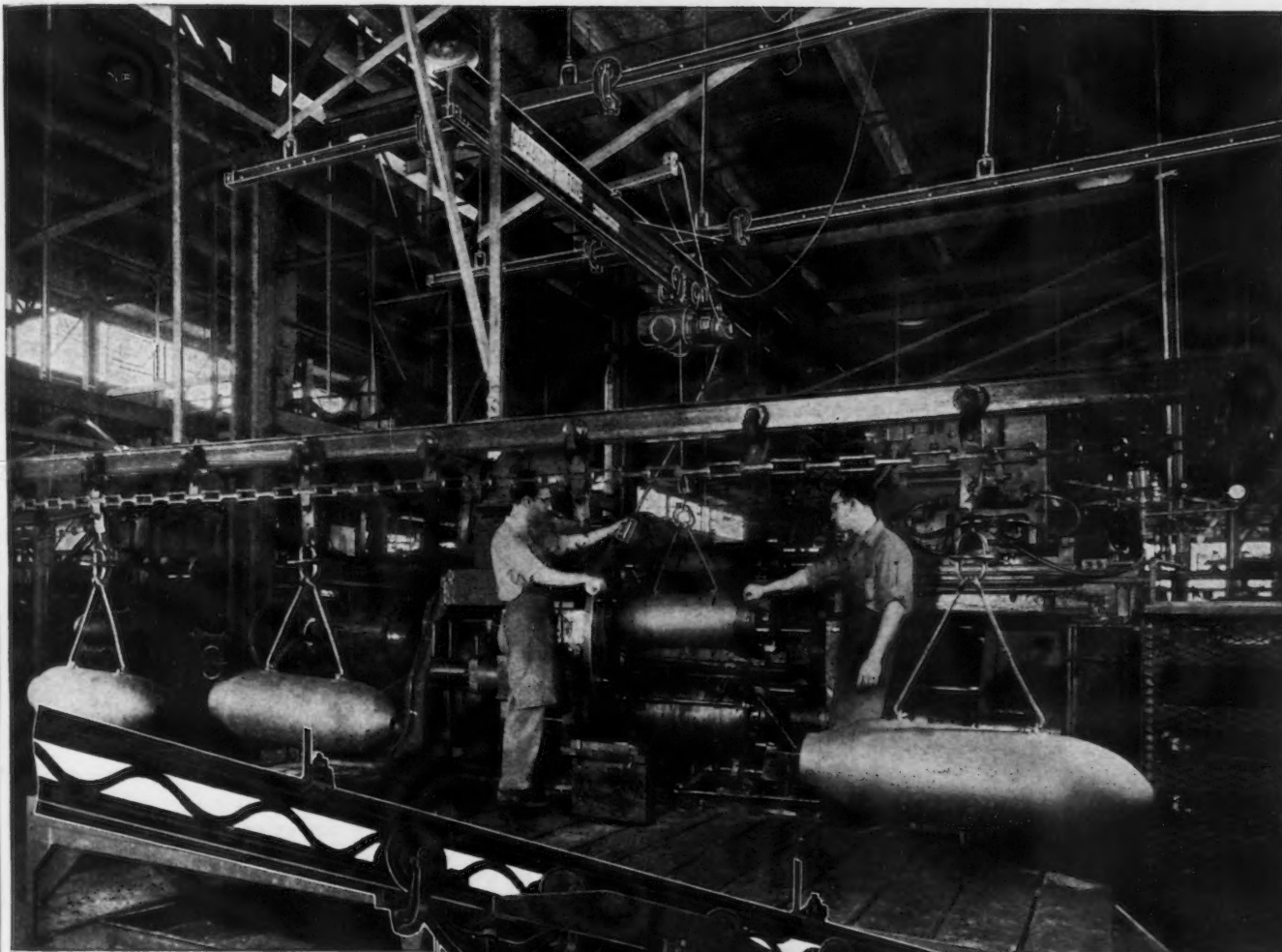
In a cartel, prices are usually fixed so that the most inefficient producer can survive and make profit. The policy of making non-bankable loans will do the same thing, that is preserve non-economic or less economic units which would normally be killed off through competition.

Mr. Maverick took issue recently with policies of "certain people" (identified as having similar views to those held by high Army officers) on the whole question of resuming civilian production. He said that he didn't think that resuming production of non-military items if the production does not conflict with war production needs, would increase complacency and make people think that the war is over. "They can read the newspapers, and see that it is not," he declared.

POINTING out that he knew that "there is a war on" (Mr. Maverick said that three of his nephews have been killed), he said that he was in favor of adjusting production to cushion unemployment attending contract terminations, and to make the fullest use of idle plant capacity.

Far from agreeing with "certain people" that unemployment forces workers into war jobs, Mr. Maverick said that it causes people to leave the labor force and go into civilian

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An American MonoRail Crane plays an important part in the manufacture of 250-lb. demolition bombs. Bomb tubes are transferred by a $\frac{1}{2}$ -ton Crane, from an automatic conveyor, to a five-station horizontal boring and tapping machine, where both nose and tail ends of each bomb are bored, faced and tapped.

American Industry has learned a lesson in production speed. Postwar production will be on the same basis. In hundreds upon hundreds of cases, American MonoRail Overhead Equipment has solved intricate and perplexing handling problems. A consultation with an American MonoRail Engineer usually proves very beneficial. Write today.



THE AMERICAN MONORAIL CO.

13103 ATHENS AVE.,
CLEVELAND 7, OHIO

work when contracts are terminated. He declared that war industries are getting along with 600,000 less people now than they had in December of last year, and that this figure would rise to 1,000,000 by the end of 1944. Record-breaking war production is explained by the increased efficiency of labor.

One case of contract termination in-

vestigated by SWPC showed that only 38 per cent of the workers were re-employed by war industries, the rest took jobs in non-war industry. This is the "melting away" of workers that some factions of WPB have objected to on the ground that manpower cannot be easily recruited again once it is dissipated and consequently some small companies are being needlessly forced to the wall.

Problems of Surpluses Discussed by Doxsey

Chicago

• • • Policies of the federal government in regard to surplus materials are of extreme importance to the steel warehouses, warned Walter S. Doxsey, president, American Steel Warehouse Association, Inc., before the 35th annual meeting of the Association here this week.

Thus far, the expressed policies have been reassuring, he said.

"But a policy is one thing; practice is another," he added. "Although a Surplus Property Administration has been established, policies have not as yet been translated into practices and the three score and 10 federal agencies offering surplus materials

still seem to go their merry and individual ways with little or no direction or control. Fortunately the agencies having much of the surplus steel to redistribute have, to the best of their respective abilities, followed sound practices and they are taking reasonable precaution to move their idle stocks into legitimate markets through normal channels.

"While the Association and its committees will continue to do everything possible to promote the orderly redistribution of steel by the offices having the greatest tonnages to sell, it is only fair to say to you now that until your representatives in Congress lay down the law and establish the authority for putting rational policies

into practice, you have no assurance that your established businesses will be secure against speculative activities. The time for this action is now while the stream of surpluses is a trickle; it will be too late when that stream becomes an avalanche."

Probably the most critical phase of the warehouse business today, according to Mr. Doxey, is the manpower situation. "The shortage of manpower is as severe and critical today as was the scarcity of steel two years ago," he said. "The armed forces have a AA-1 priority on men, and we are striving to maintain our personnel with an A-1-k rating, or with none at all. For a period of several months steel warehouses were on the War Manpower Commission's list of essential activities. At the end of last year we were removed."

Plan for Reconversion Of Small Plants May Be Approved by WPB

Washington

• • • Machinery to reconvert small plants in tight labor areas and at the same time solve local manpower problems may be approved by WPB soon in a sweeping modification of the famous but defunct Staff Memorandum No. 42 issued by Director of Industry Operations L. R. Boulware. The memorandum banned increased production in 183 Group I and II labor areas.

The order, which is now circulating, will put up to the 11 Area Production Committees and the 50 modified APUC's clearance of any increased non-military production. The committees, which have representatives of each claimant agency and in addition WPB and WMC members, will also have authority when the order is finally issued to recommend that military subcontracts be moved from tight labor areas to loose ones, in an attempt to bring war production and non-military production into balance.

This new procedure may set the pattern for reconversion, and many officials believe that it is wise in view of the fact that the APUC's which have had the job of trouble shooting war production problems will prove most capable of clearing non-military production because of familiarity with local conditions.

THE BULL OF THE WOODS

BY J. R. WILLIAMS

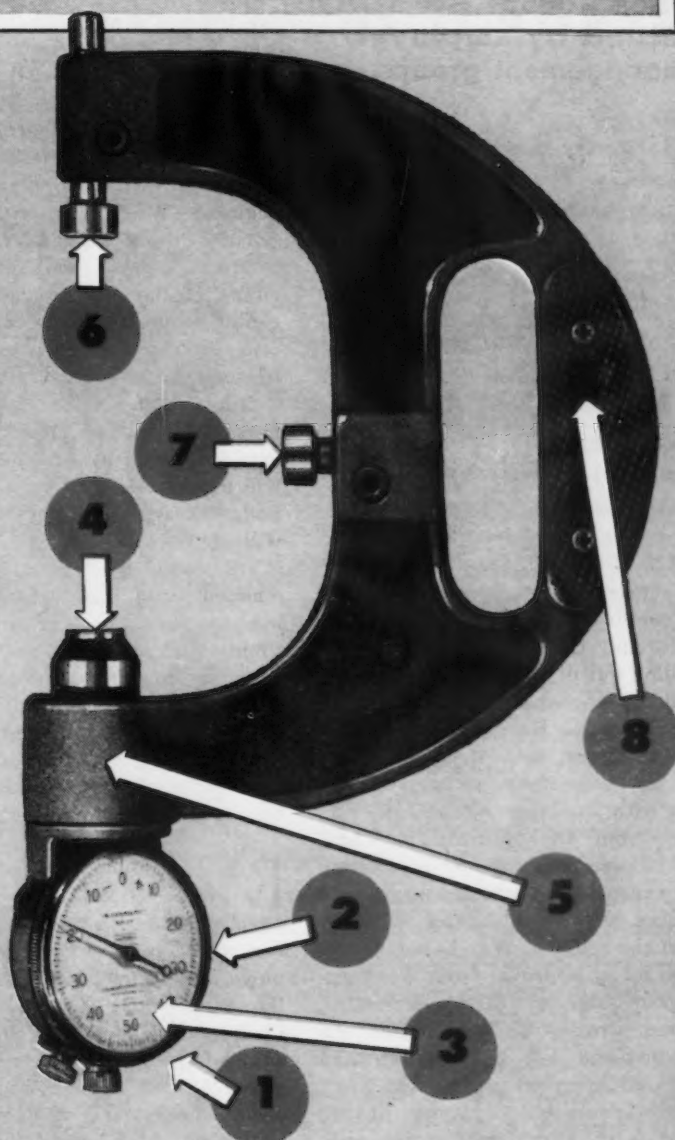


SHEFFIELD

DIAL INDICATOR SNAP GAGE

FOR INSPECTION AND CLASSIFICATION

- 1 Gage may be used with dial either at the bottom or the top, whichever is more convenient.
- 2 Dial is adjustable radially and can be swung through 360° to facilitate reading.
- 3 Scale has a range of .005"—each graduation .0001".
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- 8 Comfortable handle with plastic grip to insulate gage from heat of inspector's hand.



Work may be gaged to the accuracy of a one "tenth" indicator without removing it from the machine.

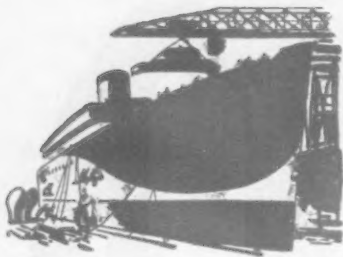


THE SHEFFIELD CORPORATION

Dayton 1, Ohio, U.S.A.

MACHINE TOOLS • GAGES • MEASURING INSTRUMENTS • CONTRACT SERVICE

• Two big machinists' locals unevicted for defying War Labor Board and holding up Navy vessels . . . Amendments to Emergency Price Control Act submitted by employer-management groups.



SAN FRANCISCO—Sideline observers here wonder when a couple of steel helmeted MP's will forcibly carry Business Agent E. F. Dillon out of Lodge 68 of the AFL Machinists in San Francisco and then go back to get Harry Hook, another business agent, and then cross the Bay to have their pictures taken again with Business Agent James P. Smith from CIO Machinists Local 13046. These persistent objectors and their respective union machinists members have openly defied a directive of the regional War Labor Board, backed up by approval from Washington. No sales of farm machinery, gingham dresses or baby shoes are here involved but construction and repairs on Army transports and Navy tenders. It's an old, old story, having caused work stoppages, conferences, disagreements and bad blood for months. Machinists receive \$1.20 per hr. when they work on new construction and \$1.34 for repair work. When a new vessel goes out for a trial trip on the Bay and then is returned for drydock completion or final adjustment, the men claim it is repair work and Navy auditors will only allow new construction rates. After long deliberation, WLB finally directed that the union perform the work at the \$1.20 per hr. new construction rate. Both unions held meetings, took a vote and decided not to work for less than \$1.34 and moreover not to

work more than 48 hr. a week in 104 uptown San Francisco machine shops. Machinists' spokesmen declared they were "awaiting the next move by the National War Labor Board and an interpretation by the Pacific Coast shipbuilding conference." Thomas Fair Neblett, the socially minded and generally labor wise chairman of the regional WLB declared, "The important thing is that the National Board now has upheld the unanimous ruling of the regional board that acceptance or rejection of a federal order is not a matter to be decided by vote at a membership meeting . . . a federal order is mandatory . . . defiance of a public order issued by a legally constituted federal agency will not be tolerated . . . members of Lodge 68 and its officers are expected willingly to do what Montgomery Ward was forced to do." Navy demanded action but did nothing, standing as usual on the sidelines and timid about moving in any way to antagonize organized labor. Members of WLB and interested bystanders wondered why it should make any difference who defied federal directives with reference to war work in wartime.

EIGHT associations of employers representing industry and management in central and northern California, led by the San Francisco Employers' Council, have submitted to the Senate and House Banking and Currency Committees the following suggested amendments to the Emergency Price Control Act, concerning enforcement of penalties for violation of wage stabilization regulations, granting of retroactive wages and voluntary wage increases:

1—Enforcement: No penalty shall be imposed in cases where the illegal wage or salary payments have been made as a result of an honest mistake of law or fact and without intent to violate the law or the regulations. Penalties shall be imposed only on those who violate or who induce or participate in violations of the act with intent to violate the law and then only after court trial with all constitutional guarantees, the court having full power to fix the criminal and civil penalties not to exceed those

which may be specified in the Wage Stabilization law. Enforcement agencies shall have the power to enter into stipulations with those charged with violations fixing penalties therefore which shall be in lieu of all other criminal or civil liability under the law or waiving penalties in cases of honest mistakes of law or fact.

2—Retroactive Pay: (a) Retroactive pay liability shall be limited to a period not to exceed 90 days. (b) Retroactivity should apply to wage rates only and not to hours or working conditions. (c) Retroactive pay shall apply only to persons on the payroll of the employer at the date of the award with the exception of employees serving in the armed forces. (d) No retroactive pay shall be awarded where work stoppages have occurred. (e) In connection with cases involving OPA action the date of final action of the OPA shall be the date of retroactive pay liability.

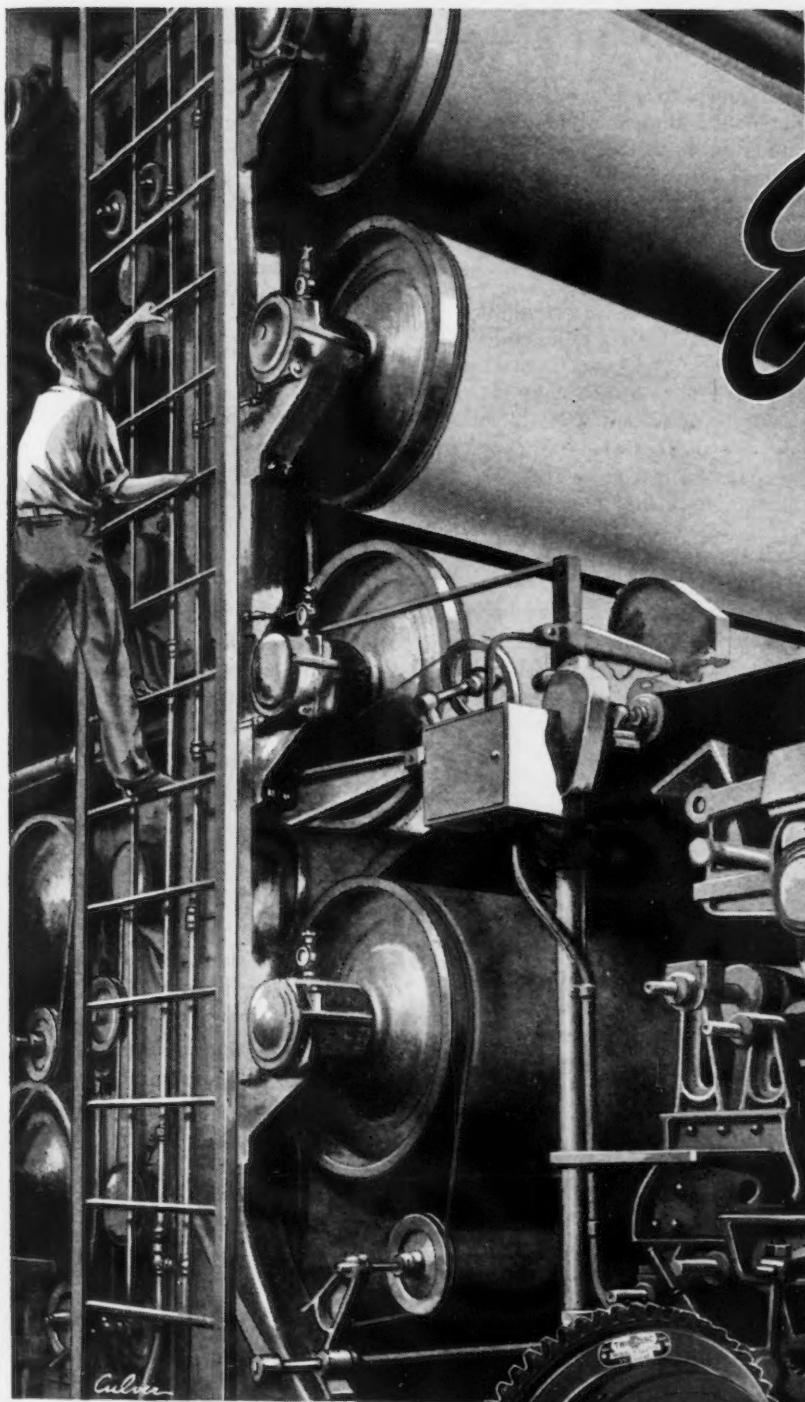
3—Form Ten Applications: The War Labor Board shall be required to process applications for approval of voluntary wage adjustments filed by employers without concurrence of any union except in cases of general wage adjustments applicable to all employees in an establishment or unit where such employees are represented by a union which has been previously certified as their collective bargaining agent or is party to a collective bargaining contract or extension thereof with the employer.

THESE proposals are the result of careful consideration by technicians and experts for management in industrial relations and follow conferences among associations and industrial groups including Sacramento Valley Associated Industries, California Association of Employers, Employers Council of Santa Clara County, Association of San Francisco Distributors, United Employers, Inc. of Oakland, San Joaquin County Industrial Association of Stockton, Citizens Association of the Salinas Valley along with the San Francisco Employers Council of which George O. Bahrs is president. When these groups learned that neither the National Association of Manufacturers nor any other organization had submitted con-

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OF IGNORANCE

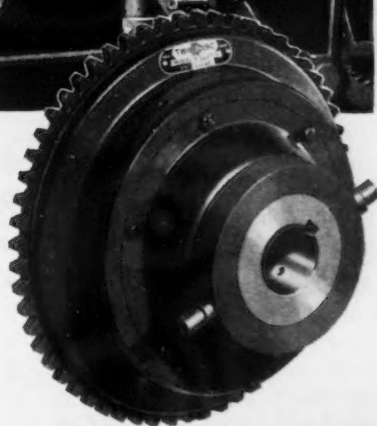
Try to imagine—if you can—where we would be today if paper were still a luxury. Low-cost books, magazines and newspapers, the tools of education, got their start when mass production methods and machines went to work on paper. The ensuing widespread distribution of knowledge, information and ideas, printed on paper, has enriched our lives immeasurably. Through the use of paper and printing man has been forever freed from the curse of ignorance.

Perhaps it's because skill and experience count for so much in paper making that you find Twin Disc clutches on so many paper-making machines. It's certain that such recognition accurately evaluates another of the contributions to progress made by the Twin Disc Clutch Company's quarter-century of specialization in industrial clutch design and manufacture.

Name almost any industry and you designate a field in which driving and driven units of essential machinery are linked by a Twin Disc product. Massive, rugged friction clutches on rock crushers—smooth acting hydraulic torque converters driving rail cars—compact, easily operated machine tool clutches—all these and other Twin Disc power links have in common the in-built stamina, endurance and dependability that result from adherence to the highest engineering and manufacturing standards.

Why not learn all about what Twin Disc Clutches or Hydraulic Drives can do for equipment you build or buy? Simply for the asking, you may have all the help our engineers can give. Write today to either of our factories. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).

This heavy duty Twin Disc clutch permits smooth starting and positive control of paper-making machines. Similar Twin Disc units find wide application in large industrial equipment of varied types.



crete suggestions to the Congressional committees they felt that a thoughtful, equitable program for amendment should be submitted for consideration.

The present penalties specifying disallowance of the entire wages for income tax purposes during the year are far more severe than those levied for violation of anti-trust laws or most criminal statutes and are levied against both intentional and innocent violators of the Wage Stabilization Regulation. It is further pointed out that cases involving violation should be submitted to trial courts with constitutional guarantees rather than hearings before tripartite panels under War Labor Board auspices in accordance with a current oral understanding and agreement with the Treasury Department. It is further suggested that a simple procedure for admission of violation and stipulation with penalties specified should be worked out to dispose of an enormous number of relatively unimportant wage violation charges.

With reference to retroactive pay it is pointed out that many months and in numerous instances more than a year elapses between the expiration of an old contract and the date of the final award and that in some instances not only wage rates are increased but the number of hours which may be worked in straight time are reduced. After such an award employers must search out persons who have long left their employment and in many instances who have worked but for short periods of time in order to pay the retroactive wages ordered by the board. A 90-day limitation is suggested as a stabilizing factor.

Proposal that no retroactive pay be awarded where work stoppage has occurred through wild-cat or "quickie" strikes, and the further provision that where OPA price relief is ordered wage increases should not be effective until price adjustments become operative seem reasonable from considerations of equity and economies.

to work in a foreign country, and liberal provision for the maintenance, educational training and retraining of persons unavoidably out of employment. (2) Prompt termination of contracts for war material, prompt clearance of government owned machinery and materials from war contractors' plans and speedy payment to contractors of sums due them by governments in order to release working capital for reconversion. Orderly disposition of government owned surplus stocks of war materials and the application of judicious policies for the disposition or other utilization of government owned war plants and equipment. (3) Retention, as long as shortages exist, of such war created economic controls as are necessary to prevent inflation and the demobilization of such controls as rapidly thereafter as is consistent with the public welfare. (4) Adjustment of tax systems to encourage rapid reconversion, reconstruction and economic expansion while maintaining an equitable distribution of tax burdens, and (5) development of effective mechanisms for adequate financing of the reconversion, reconstruction and expansion of industry, commerce and agriculture.

The employers' group also asked for measures to discourage monopolistic practices and to encourage technological progress, to maintain a reasonably flexible system of prices and wages, to encourage the transfer of workers and productive resources from declining to expanding industries, and to attain a high degree of mobility of resources and freedom of access to alternative employment.

ILO Delegates Debate Proposals of U.S.

Philadelphia

• • • The delegates of 41 nations spent the second week of the 26th world conference of the International Labor Organization debating the proposals of the United States Government which would bring to every country the social security, welfare and labor laws in effect here. In presenting this program, Frances Per-

kins, Secretary of Labor and chairman of the American government delegation said that the plan would be modified to fit conditions of individual nations.

The five points of the plan would provide opportunity of useful and regular employment to all who want work, at fair wages or returns and under reasonable conditions; would establish minimum standards of employment; provide for child welfare; raise living standards, and provide sickness and old age benefits.

The proposal received some opposition as John A. Beasely, delegate of the Australian government, pointed out that the plan avoided international commitments and would have the effect of denying the right of collective bargaining.

Based on the fact that no government acting alone can provide full employment and high productivity, the United States employer representatives presented their program of reconversion. Their proposals urged (1) effective arrangements for the orderly and expeditious demobilization and repatriation and the early absorption in productive peacetime employment of members of the armed forces, civilian works and workers transferred

... Cited for Awards ...

• • • The following companies have won the Army-Navy E award for outstanding war production:

Camfield Mfg. Co., Grand Haven Mich.
Emerson Radio and Phonograph Corp., New York.
C. E. Erickson Co., Inc., Des Moines, Iowa.
Kimble Glass Co., Vineland Plant, Vineland, N. J.
Philip Knitting Mills, New York.
Standard Tool Co., Leominster, Mass.
Voss Brothers Mfg. Co., Davenport, Iowa.
Gould & Eberhardt, Inc., Irvington, N. J.

Maritime M

Inland Steel Co., Chicago (gold star).
E. F. Hauserman Co., Cleveland.
Aetna Sales Corp., Pottsville, Pa.
Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.
Pacific Valve & Pump Exchange, Long Beach, Cal.
Washington Stove Works, Everett, Wash.
Western Industrial Engineering Co., Los Angeles.

Russian Industrial Rehabilitation Rushed Washington

• • • Restoration of wrecked iron and steel plants in recaptured areas in Russia is being expedited, according to trade reports reaching the Department of Commerce. A plant already restored in the Donets Basin has produced its first 1000 tons of steel rails. Another plant will be producing at from 50 to 70 per cent of capacity by the end of this year. Rapid progress has also been made in restoration of iron ore mines abandoned two years ago.

MORE ACCURATE HYDRAULIC PRESSURE CONTROL

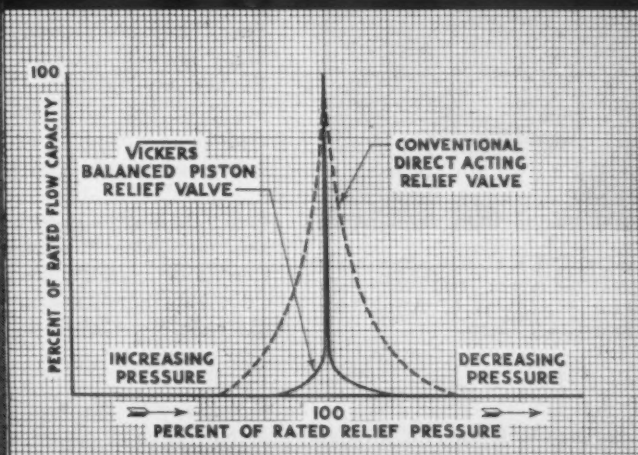


CHART SHOWS PRESSURE READINGS OBTAINED DURING A VARIATION OF FLOW RATE FROM ZERO TO MAXIMUM AND BACK TO ZERO

VICKERS Balanced Piston Type **RELIEF VALVES**

As indicated by the chart above, Vickers Balanced Piston Type Relief Valves have a negligible pressure variation throughout their capacity range. In these valves a hydraulically loaded and balanced piston takes the place of the customary spring-loaded direct-acting relief mechanism. This means more sensitive operation as well as greater accuracy throughout the wide pressure range.

This accuracy of control prevents pressure override when sudden changes in pressure occur in the hydraulic system. Compact design, longer operating life, installation directly in the pressure line, quiet operation, and simple adjustment are other advantages of these Vickers Balanced Piston Relief Valves. See Bulletin 38-3 for complete information.

Vickers Application Engineers will gladly discuss with you how Vickers Hydromotive Controls can be used to your advantage.

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Representative of More than 5,000 Standardized Vickers Units
for Every Hydraulic Power and Control Function



CONSTANT DELIVERY PUMPS



FLUID MOTORS



DIRECTIONAL CONTROLS



VOLUME CONTROLS



PRESSURE CONTROLS



CONTROL ASSEMBLIES



VARIABLE DELIVERY PUMPS



DR. LAURENCE C. HICKS, metallurgical engineer and associate director of research, Allegheny Ludlum Steel Corp.

PERSONALS

• • •

• **John W. White** has been elected president and general manager of the Westinghouse Electric International Co., subsidiary of the Westinghouse Electric and Mfg. Co.; **William E. Knox**, formerly assistant general manager, has been elected vice-president. Mr. White succeeds **George H. Bucher**, who becomes chairman of the board of the International Co. Mr. Bucher is president of the Westinghouse Electric & Mfg. Co.

• **G. H. Gaites** has been appointed regional sales supervisor of a new Cleveland branch office of the Bristol Co., Waterbury, Conn. **H. C. Clarke** succeeds Mr. Gaites as district manager of the Pittsburgh branch office.



JAMES A. ROWAN, director of public relations and advertising, Great Lakes Steel Corp.

• **Dr. Laurence C. Hicks** has been appointed metallurgical engineer and associate director of research in the Magnetic Products Division, Allegheny Ludlum Steel Corp., Brackenridge, Pa. He had been in the research department since 1933, and since 1936 has been conducting research on materials for the electrical industry.

• **H. S. Hubbard** has been appointed assistant engineer in the Power Transformer Engineering Division at General Electric Co.'s Pittsfield Works. He succeeds **A. B. Hendricks, Jr.**, who has retired after 43 years of service with the company.

• **Arthur J. Miller** has been elected president of the Chicago Wheel & Mfg. Co., succeeding his father, the late **Henry E. Miller**, who founded the company in 1894. Mr. Miller joined the company in 1915 in the special formula department and in 1926 was elected treasurer.

• **O. J. Leone** has been appointed Pittsburgh regional manager of Steel Mill Division, The Bristol Co., Waterbury, Conn. Mr. Leone's duties in his new position will include special engineering work of the division in the Pittsburgh, Buffalo and Cleveland areas.

• **H. E. Bauer**, formerly with the British Ministry of Supply Mission, Alloy Division, has joined the Purchasing Department of **A. Milne & Co.**, New York.

• **Mehmed S. Zia** has joined the Export Division of American Brake Shoe Co., New York, as a foreign representative. He will represent the company in the Mediterranean zone and the Near East, with headquarters in Cairo.

• **Eugene W. Wasielewski**, of Fairfield Engine and Airplane Co., has been appointed chief engineer by the McCulloch Engineering Co., Milwaukee, and will direct design and development of superchargers.

• **Lawrence J. Parrish** has been appointed assistant to the president of Cluett, Peabody & Co., Inc., New York. He had been with **A. O. Smith Corp.**, Milwaukee, for 21 years.

• **R. H. Thielemann** has been appointed development engineer for Allegheny Ludlum Steel Corp., Brackenridge, Pa. Mr. Thielemann was formerly associated with the research laboratory of the General Electric Co., Schenectady.

• **Albert T. Huizinga** has been elected vice-president and treasurer of the National Supply Co., Pittsburgh. He joined the company as treasurer in July, 1943. Formerly, he had been assistant treasurer for **Montgomery Ward & Co.**, Chicago, and prior to that time he had been in the banking business in Chicago.

• **Walter L. Rathmann** of St. Louis, has been elected a member of the board of directors of **General Steel Castings Corp.**, Eddystone, Pa.

• **James A. Rowan** has been appointed director of public relations and advertising, Great Lakes Steel Corp., Detroit. Mr. Rowan has been special assistant to the director of the WPB Steel Division and at various times has served as industrial editor of the *Pittsburgh Press*, news and markets editor of *THE IRON AGE*, managing editor of the *Youngstown Telegram* and other papers.

• **R. A. Neal**, manager of the Switchgear Division at East Pittsburgh; **J. K. B. Hare**, manager of Central District sales activities with headquarters at Pittsburgh; **John H. Ashbaugh**, manager of the Appliance Division with headquarters at Mansfield, Ohio, and **H. H. Rogge**, manager of the Washington Government Office, have been elected vice-presidents of Westinghouse Electric & Mfg. Co., East Pittsburgh.

• **Godfrey Strelinger**, formerly assistant to the general sales manager, Nash Motors Division, has been elected treasurer and assistant secretary of **Nash-Kelvinator Corp.**, Detroit, succeeding the late **G. V. Egan**. Mr. Strelinger also has been elected a director and secretary-treasurer of its subsidiary, **Refrigeration Discount Corp.**

• **Andrew G. Nelsen** has been appointed manager of the Middle Western district, Westinghouse Lamp Division, Westinghouse Electric & Mfg. Co. In this position, Mr. Nelsen will have charge of all lamp sales activities of the Middle Western district, making his headquarters in Chicago.



AINSLIE Y. SAWYER, vice-president, Joseph T. Ryerson & Son, Inc.

• **Ainslie Y. Sawyer**, assistant to president, has been elected vice-president in general charge of purchases, Joseph T. Ryerson & Son, Inc., Chicago. **Harold B. Ressler**, vice-president, will be in general charge of sales in all territories. **Harry W. Treleven**, assistant manager of the New York plant, has been appointed manager of that plant, and **Thomas Z. Hayward**, becomes assistant general manager of sales.

• **Wilbur B. Driver** has been elected chairman of the board of directors of the Wilbur B. Driver Co., Newark, N. J. He was succeeded as president of the company by his son, **Robert O. Driver**. **William J. Wind** was elected vice-president in charge of production; **Sidney A. Wood**, vice-president in charge of sales; and **Karl R. Tallau**, secretary and treasurer.

• **Walter D. Smith** of Tulsa, Okla., has been appointed commercial vice-president, Worthington Pump & Machinery Corp., Harrison, N. J. For the past four years Mr. Smith has been manager of the Tulsa district office, as well as southwestern manager of the Engine Sales Division. In his new capacity, he will supervise the Corporation's business in the Southwest.

• **T. C. Sullivan** has been made assistant to the president of the United Aircraft Corp., New York. He was formerly with Vultee Aircraft, Inc., as assistant to the president and secretary of the corporation.

• **Dr. Harry L. Frevert**, chairman of the board of The Midvale Co., Philadelphia, has resigned. Dr. Frevert

will, however, continue as a member of the company's board of directors. No successor as chairman has been named.

• **J. Russell Gnau**, associated with Charles E. Sorensen for the past 25 years at the Ford Motor Co., Detroit, has joined John W. Thompson in the supervision of the company's public relations department.

• **Herbert A. White** has become associated with the Smeeth-Harwood Co., Chicago, as manager. Since 1927, Mr. White has been with National Bearing Metals Corp., as Pittsburgh district sales manager.

• **H. P. Bigler**, former assistant to the president, has been named executive vice-president of Connors Steel Co., Birmingham, and **L. D. Luey**, former management engineer, has been named comptroller. Mr. Bigler has been associated with the company since 1942, Mr. Luey since 1941.

• **Sam Tour**, president, of Sam Tour & Co., Inc., New York, has severed his affiliation with Barium Steel Corp. due to the press of wartime work and postwar planning. Mr. Tour had been serving as a member of the board of directors, manager of the Minerals Division and as consulting engineer for the company.

• **Harold F. Wood** has been elected vice-president and general manager of Ingalls-Shepard Division at Harvey, Ill., of the Wyman-Gordon Co., Worcester, and **Robert M. Powell** has been made vice-president and general manager of sales with offices in Detroit. Mr. Wood and Mr. Powell have been associated with the company for more than 25 years and are members of the board of directors.

• **D. M. Stembel** has been appointed vice-president of Lockhart Iron & Steel Co., Pittsburgh. Mr. Stembel



D. M. STEMBEL, vice-president, Lockhart Iron & Steel Co.

was formerly manager of hot rolled sales for A. M. Byers Co.

• **Edmund S. Davenport** has been appointed assistant to R. E. Zimmerman, vice-president, research and technology, U. S. Steel Corp. of Delaware. Joining the staff of the research laboratory of the U. S. Steel Corp., Kearny, N. J., in 1929, Mr. Davenport since 1935 has supervised the work of the metallurgical section of that laboratory.

• **J. B. O'Connor** has been elected executive vice-president of the Dresser Mfg. Co., Bradford, Pa. **Arthur R. Weis** and **Lyle C. Harvey** also were elected vice-presidents.

• **I. L. Cantwell**, former production manager of the Bristol plant, United States Rubber Co., New York, has been appointed sales manager of battery separators. Mr. Cantwell has been with the company since 1922.

OBITUARY...

• **Ralph W. Hutchens**, 52 years of age, president of Hutchens Industries, Inc., and former president of the Gillette Rubber Co., both at Eau Claire, Wis., died April 23.

• **A. F. Wagner**, head of the A. F. Wagner Iron Works, Milwaukee, since 1890, died April 24, at the age of 85.

• **Leslie C. Cunningham**, assistant regional director for Canada, U. S. Steel Export Co., New York, died April 27.

• **Charles A. Clarke**, vice-president of the Universal Boring Machine Co., Hudson, Mass., and former president, a position he relinquished in 1941, died April 27.

• **Fred M. Emerson**, for many years an executive of the American Bridge Co. at Milwaukee and later a consulting structural engineer, died April 15. He was 68 years old.

• **Michel Nigro**, inventor and mechanical engineer, well known in the machine and wire spring industries, died in Worcester, April 21. He was 62 years old.

Fatigue Cracks.

BY A. H. DIX

Postwar Nightmare

• • • We pin an orchid on the pneumatic bosom of Pioneer Rubber, of Willard, Ohio, for one of the sagest comments we have yet seen on postwar planning for the average manufacturer. A little folder entitled "The Sad Story of Our Postwar Planning," signed by J. O. Gibson, Pioneer's president, begins:

"... we have been frightened practically out of our wits by the threats we've read about what would happen to us after the war if we neglected our postwar planning ... so we picked out one of our brightest young men ..."

The bright young postwar planner collapsed under the strain of trying to keep up with the flood of postwar literature. He is now in a hospital, leaving Pioneer in a hell of a spot, for, as the folder explains:

"... the war may be over before we can find out what postwar planning is all about ... Of course, our laboratory has gone right ahead with the development of new products. Our Sales Department is thinking about how to distribute the new peacetime products when we can make them, and we've increased our advertising so our peacetime customers won't forget us."

Pioneer confesses that in moments of weakness it has had "the terrible thought that maybe everybody is so busy writing and talking about postwar planning that nobody has time to do anything about it."

"But," it concludes, with tongue still in cheek, "what's to become of us if we don't find out how to do proper postwar planning is something we lie awake nights worrying about. ..."

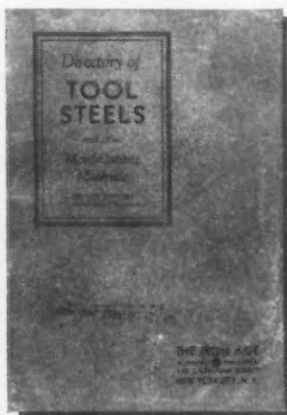
Postwar variables exceed those encountered by a palsied man in a dark room, armed with an elastic foot rule, trying to measure a slab of Jello. But, to yield to our yen for uttering the obvious, there is one invariable, which is that the manufacturer able to supply the best product for the least money will be in the coziest position, under whatever rules the postwar game is played.

Brains Department Reaches Pinnacle

• • • We thought we had overlooked no opportunity to remind you that the brains department's contributions to your well-being are monumental, and are chagrined to find that all along we have been guilty of understatement. Frank W. Vanderhoff, of our field staff, finds that the Gem Heat Treating Co., of New York City, thinks so highly of the Tool Steel Directory, one of the brains department's works, that it keeps the Directory in the office safe.

As this is surely one of the greatest honors ever accorded the work of a technical journal, we pleaded with the Gem people to part with their treasure. They were glad to do so, as we gave them a copy of the new edition (price \$1) free of charge. The old one is beautifully grease stained, thumb printed, dog eared, and annotated with heat treating formulas. We are putting it in our safe.

For the benefit of those who came in late, the Directory is a 77-page alphabetical list of the 1500 brands of tool steels and carbides. It specifies the type, composition and supply source.



Apronym

• • • Chief investigator for Senator McCarran's committee to investigate the liquor industry is J. V. Sourwine.

The Ottawa directory lists a laundry that operates under the name of Wah Sing & Co.

—F.E.L.

Wrong Vowel

• • • An aluminum company big shot chides us for referring to Bernard M. Baruch as "Barney." "Berney" is right, he says. This is a surprise to us, as we had always heard him referred to as "Barney," even by the Washington-wise Leon Wesley Moffett, who writes your favorite family journal's Washington section (see page 90).

We don't know about "Moff," but our own use of the nickname implies a degree of familiarity between the elder statesman and us that the facts do not support. So in future we will call him "Mr."

Unwanted Consonant

• • • We should have known better, any way, as our own Bernard, who is Bernard L. Herman, one of this journal's business ambassadors, responds to the name of Berney.

Which reminds us to mention that he handed us a copy of the Ohio State University's "Engineering Experiment Station News," on which our stencilled address reads "THE IRON CAGE." We always get the copies all right, but will the person who takes care of Ohio State's mailing lists please correct our stencil, as the extra "C" excites our claustrophobia.

No Knives, No Dishes

• • • The incidence rate of stomach ulcers mounts rapidly among technical journal publishers during wartime. This is due in great part to fear of the censor. The censor is especially touchy about details of experimental aircraft, so if more than two lighted matches are applied to our bare soles for publishing this story about lack of essential equipment on a new trial bomber, we will break down and confess that Stan ("Assembly Line," see page 86) Brams gave it to us:

The bomber started from a midwest point, bound for the Coast. It had a regular crew of eight, a second crew of eight, and a half dozen civilian observers. After a few hours, hunger set in, and a regular crew member reported a well-stocked fireless cooker in a tail compartment.

The cooker was opened; a steaming hot side of beef and 5-gal. can of hot coffee were lifted out, as lips were licked and hands rubbed. But 44 eyes widened in horror when it was discovered not a single knife, fork, plate or cup was aboard.

The co-pilot had a small pocketknife on his watch chain, and beef was painfully chipped off, a mouthful at a time. Ashtrays were unhooked from the walls, to serve as cups. The spirit evoked by these makeshifts was ungala. By the time the Coast was reached the aggregate disgruntlement contributed noticeably to wing loading.

At a certain airport the "Cutlery, Cups, etc., item on the check list of what-to-do-before-a-bomber-takes-off-on-a-long-flight is now underlined in red.

Puzzles

• • • Last week's canteen had 22 packs of cigarettes. You must solve this within ten seconds to earn a gold star for mental alertness (filched from Dictaphone's "It's Said and Done"):

If before the cat ate a mouse the cat weighed 2 lb. plus half its own weight, what was the weight of the cat after the cat ate the mouse?

"When Silence Was Golden"...

Aboard the U. S. S. Trout

SILENTLY the submarine "Trout" crept into Corregidor with a precious load of ammunition and silently she lay under the very noses of the enemy as she loaded gold, passengers, and papers of state. "Her softly purring engines could hardly be heard a dozen feet away," said one of her passengers.

Silence was her protection, and the silence of her engines was a matter of precision and care by those who built them.



Powered with
FAIRBANKS-MORSE
DIESELS

Dear Editor:

STEEL CARTRIDGE CASES

Sir:

In a recent "News Front" you say that there is a possibility of the Ordnance Department returning to the manufacture of steel cartridge cases in a number of sizes. Could you tell us who is in charge of this matter in the Ordnance Department, Washington?

CHARLES A. DREISBACH,
President
Dreisbach Engineering Corp.,
45 Warburton Ave.,
Yonkers 2, N. Y.

● We have no information additional to that published. We learned from certain contacts with the Army Ordnance Department that by fall there will be some return to steel case manufacture, even though right now the Ordnance publicity is directed toward the abandonment of steel cases in favor of copper.—Ed.

CONCAVE VS. CONVEX ROLL

Sir:

Your "Continuous Casting" article of Feb. 24 contains this statement, "John B. Tytus of Armco brought forth what now seems such an obviously simple scheme of a concave roll face, each stand of progressively less concavity."

Would you inform us whether this word concave is correct or whether you mean convex, as it has been common practice to crown rolls in the non-ferrous industry?

L. B. WALLACE,
Metallurgist
Revere Copper and Brass Inc.,
Dallas Division,
2200 North Natchez Ave.,
Chicago, Ill.

● In the continuous rolling of steel the successive stands have concave roll faces of progressively less and less concavity. In the continuous rolling of non-ferrous metals the exactly opposite form is used—the successive stands have convex faces of less and less convexity.—Ed.

STRIKING PRESSURE

Sir:

An object weighing 10 pounds dropped 10 feet will exert 100 foot pounds of energy on object it strikes. How many pounds per square inch will it exert on the object it strikes?

T. C. NATION,
Research Engineer
LeTourneau Co. of Georgia,
P. O. Box 1031,
Vicksburg, Miss.

● The pressure per square inch depends upon the area of contact. If a piece of sheet steel weighing 10 lb. landed in a horizontal plane, pressure per square inch would obviously be considerably less than if a 10 lb. chisel landed point first.—Ed.

CONTINUOUS CASTING

Sir:

I found your article on continuous casting (Feb. 24 issue) most interesting and useful, but would like to point out one matter on which I feel you

have overstepped the limits of optimism. I refer to the mention of producing free-cutting steels by the Soro process. This is certainly not the sort of material which should be cast by the Soro process, particularly the leaded varieties, which are difficult to make uniform anyhow.

DR. R. GENDERS
British Central Scientific Office,
Dupont Circle Bldg.,
Washington 6, D. C.

● You may be correct, as there has always been considerable difficulty in making leaded steels uniform. But very little work has been done with steels in Soro equipment and it is too early to assume that in the Soro casting process some of the characteristics tending toward non-uniformity might be less severe than in current methods of production.—Ed.

SONIC TESTING

Sir:

A recent "News Front" mentioned a new method of testing castings sonically. Any further information you may have will be appreciated.

G. E. STRYKER,
Metallurgical Engr.
Bell & Howell Co.,
7100 McCormick Road,
Chicago 45

● See the May 15, 1941, issue (page 48), for considerable information on sonic testing as practiced in Germany. In the forthcoming issue of June 1, we will publish another article based on English research. So far as we know, no equipment for this type of testing is for sale.—Ed.

FINANCIAL ANALYSIS

Sir:

Would it be possible for me to get some reprints of the financial analysis of the steel industry, 1943-1942, printed in your Apr. 20 issue, pages 120-121?

ROBERT W. WOLCOTT,
President
Lukens Steel Co.,
Coatesville, Pa.

Sir:

Could you let me have two or three reprints of the financial analysis? The method of presentation is excellent and I think you are to be congratulated on the way the large amount of valuable information has been concentrated into such a readable tabulation.

F. H. SANITER
British Raw Materials Mission,
1801 K. St.,
Washington, D. C.

● Reprints have been sent you.—Ed.

GAS PICKLING

Sir:

I understand there is a new method of pickling wire involving the use of chlorine gas and am obliged if you could tell me who is handling this.

GEORGE D. HARTLEY
372 May St.,
Worcester 2, Mass.

● This method was developed by the Sharon Steel Corp., Sharon, Pa. A similar method is controlled by the Surface Combustion Corp., Toledo, Ohio. See the Apr. 20 Iron Age, page 64, for the article, "Gas Pickling of Steel."—Ed.

MACHINE TOOL SURPLUS

Sir:

Our compliments to Mr. Leach on his article, "Future of Machine Tool Industry" in your Apr. 13 issue. The proposed legislation mentioned on page 58 is included in a bill presented by Senator Murray, S. 1609, and then amplified in a bill introduced by Congressman Joe Starnes, HR 4009.

There are two important phases in these bills, (1) the step by step disposal which is also comprehended in your two articles, and (2) the exchange principle by which all replacements, whether government or industrial or educational, turn in an old machine, obsolete either by reason of its condition or design, according to rules determined by the Tool Utilization Commission proposed by the W.P.B. These old machines become subject to scrap classification.

Thus the absorption of the government surplus would be a normal procedure or rationalism, not involving either the philosophies of scarcity or plentitude, and there is no question but that a separate handling of equipment that is technical in nature or requiring skill and technique in its operation is desirable. However, the Administration, having proceeded with the Baruch-Hancock report, it is the writer's understanding that the essential features of the two bills herein referred to are being integrated by Senator Murray into the George-Murray Bill S. 1730, which is intended to make the Office of Demobilization on surplus property responsible to a statute law by an act of Congress rather than to operate by Executive edict.

N. P. LLOYD
Lloyd and Arms,
Philadelphia 4

CENTRIFUGAL CASTING

Sir:

Can you let me have a list of centrifugal precision steel casting machinery manufacturers?

MEYER H. DOLITON
40 Monroe St.,
New York 2

● The only company we know of that makes centrifugal casting equipment is The Centrifugal Casting Machine Co., P. O. Box 947, Tulsa, Okla.—Ed.

TOOL STEEL CODING

Sir:

I found the article on tool steel coding at the Consolidated Vultee Aircraft Corp., in your Mar. 30 issue very interesting and request that you send me two copies of it.

F. J. DRAKEMAN, Manager,
Planning Dept.
Firestone Tire & Rubber Co.,
Gun Mount Division,
Akron, Ohio

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This Industrial Week . . .

- **Steel Ingot Output Sets 30-Day Peak; Rate Steady This Week**
- **Additional Shell Buying May Be Added to Present Big Load**
- **War Dept. Formulates Rules Covering Removal of Materials**

AS shell steel tonnages placed with mills mounted steadily in size this week, the effect of the large program upon other steel deliveries became more emphatic, and still there was talk that additional munitions purchases might be superimposed upon the present load.

In addition to the possibilities of slowing up rail production as mentioned last week, shell steel requirements may affect seamless tube rounds and flat rolled material. Every bar mill will be forced to step up its production to the maximum and the units making larger size bars will be loaded with directives for shell steel. WPB may even have to reduce the allotments of steel given to non-integrated mills for further conversion, it is said.

In Canada, too, the shell program is putting pressure on the steel industry. Mills of the Dominion again report large backlogs of orders as shell plants swing back into full operation. Canadian forge shops may require heavier shipments of forging billets from the United States, which would exert further tension on the steel situation in the United States.

Steel ingot output last month set a 30-day record at 7,568,530 net tons, according to the American Iron and Steel Institute. This was slightly below the March total. This week national steel ingot operations are estimated by THE IRON AGE as unchanged from last week's revised rate of 99 per cent.

A NEW shell container program is said to be under way which would double the present program and extend through the third quarter on steel deliveries. This would mean an additional 150,000 tons of sheet for the third quarter. The program is an extension rather than an increase.

It is reported WPB already has notified steel producers of the amount of reduction on plate for the third and possibly fourth quarters. Some plate reductions already have been made but this space has been quickly filled with sheet, on WPB directive.

New Escalator Clause Issued

Washington

• • • The War Department provided an escalator clause last week having the effect of tying steel, coal and lumber prices to OPA ceilings. At the same time, the Department provided machinery for redetermination of contract prices through negotiation for contracts that continue past the period OPA prices are in effect.

The changes in procurement regulations provided for insertion of articles in contracts stating that the prices charged are "not in excess of the maximum prices established by OPA" and that prices shall be "increased or decreased by the same number of cents, or fraction thereof per unit that such maximum price may be increased or decreased."

Sheet deliveries range from October to February. Plates are critical through parts of July and August.

Evidence that the steel cartridge case program is by no means dead is contained in steps taken by the Navy to double production of 40 mm. steel cases. Increased output of long ternes has been authorized to fulfill new requirements for expendable emergency fuel tanks for aircraft.

FURTHER tightening of the pig iron market, particularly in upstate New York, is being noted by producers. Foundry demand is heavy, even down to the small shops, which are handling all the business they possibly can with shorthanded staffs.

Makers of alloy steel are expected within a few months to begin accepting orders on a hardenability basis for three types of alloy steel, marking a drastic change in sales practice.

The War Department now has formulated regulations to control removal of materials and machinery in plants of all types of contractors and subcontractors where contracts are terminated except government owned plants. They are contained in Section VI-A of Procurement Regulation 15.

Meanwhile, Rear Admiral George F. Hussey, Jr., chief of the Navy Bureau of Ordnance, speaking at San Francisco, said he will urge that government built and privately controlled and operated plants be retained to form the backbone of the standby ordnance plant installation.

THE Senate passed the highly controversial Murray-George Contract Termination Bill on May 4 and sent it to the House where it was referred to the Judiciary Committee. The bill has for its purpose speedy and fair compensation to war

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contractors and subcontractors in contract termination for all reasonable costs including costs for removing and storing termination inventory and allowance for profits on the preparations made and work done for the terminated part of the contract, including the payment of 2.5 per cent interest on all unpaid claims beginning 30 days after termination.

Surplus Property Administrator Will Clayton appeared before the War Contracts subcommittee of the Senate Military Affairs Committee on May 5 and reiterated his earlier position that legislation on surplus disposal is not desirable at present.

SWPC Director Maury Maverick on May 3 announced a reconversion plan which other WPB officials predict will be put into effect by September. The plan is a combination of the regional surplus plan and the plan to employ area production urgency committees in shifting to peace production. The regional surplus plan would be applied in loose labor areas. Essential non-military production authorized by civilian agencies would be assigned to the maximum extent possible to small plants in Group III and IV labor areas. The requirements that cannot be filled in small plants in loose areas would then be directed to small plants in the tighter labor areas.

THE recent blows against Germany in the cutting off of shipments of Turkish chrome and Spanish tungsten ore are regarded by American steel makers on the basis of published reports of the actions as significant and damaging to the Nazi war effort.

A report is current that investigation may soon start covering CMP allotment numbers being furnished steel companies by customers. Under CMP, the steel company has no way of knowing whether CMP numbers are authentic, but must take the allotment numbers and orders from the customer. It is being hinted that many of the CMP allotment num-

Draft Loss 6 Per Cent at Most

Washington

••• The most pessimistic estimates in the production drop expected in the steel industry caused by the drafting of all men under 26 years old is 5 to 6 per cent for the remainder of the year. This parallels the percentage of workers to be lost by the industry, manpower officials say.

War Department officers say that all critical industries will be shy about 100,000 workers this year.

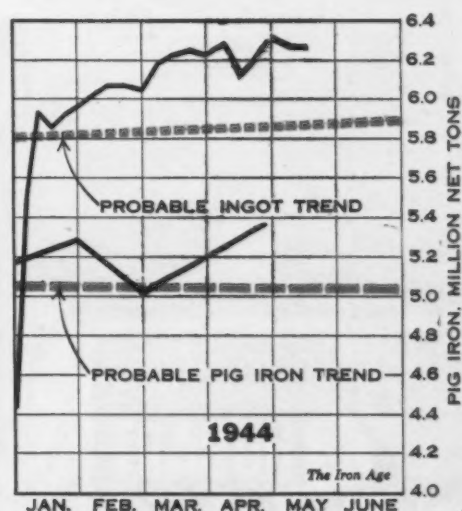
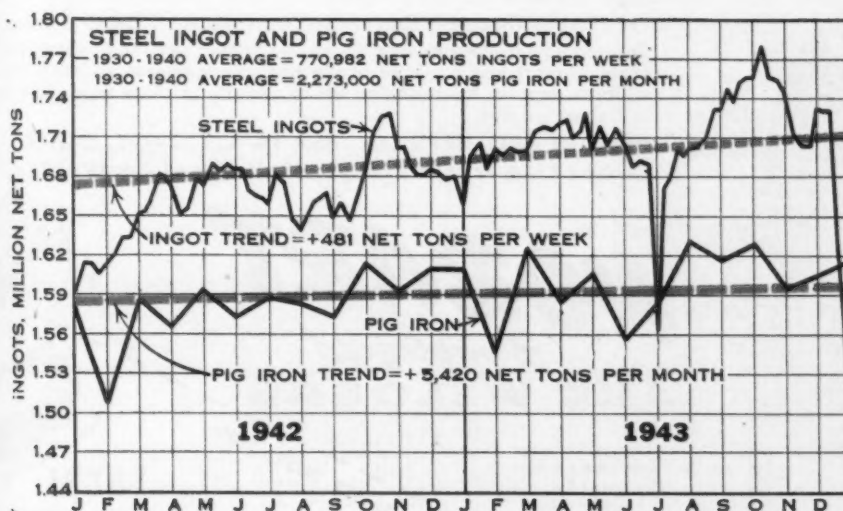
Encouragement was given industry by the announcement on Saturday by Maj. Gen. Louis B. Hershey that draft registrants under 26 are sufficiently numerous to fill all draft calls until fall. Selective Service said there are 1,699,213 registrants under 26.

While draft officials think that most of the year's needs can be met by the number of men under 26, draft boards will only be obliged to take from 175,000 to 185,000 men between 26 and 30 to meet quotas under present replacement estimates. With 400,000 men between 26 and 30 in 1A, all industry stands a good chance of retaining its more than 800,000 deferred in this age group.

Meanwhile, Steel Division, WPB and the officials of the Army and Navy and labor agencies are trying to solve the 20,000-man deficit in labor supply for foundries.

bers, which some customers are using, are not authentic. By this is meant that some consumers are said, or are believed to be, ordering more steel under the CMP tickets than they are supposed to. It is quite possible that this may turn into a full scale investigation.

A series of strikes last week in the Pittsburgh district, involving steel plants and coal mines, cut into direct war production involving such items as landing craft and war steel. At the Gary plant of American Bridge Co., 300 welders were out 32 hr. Saturday and Sunday in a wage dispute, thus affecting 500 other workers in the welding department.

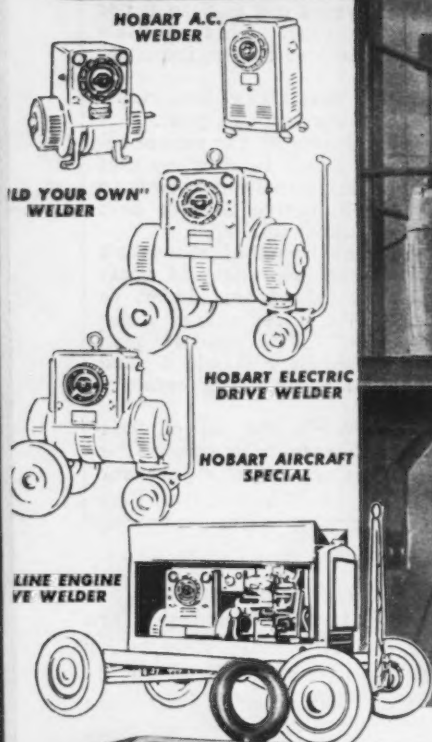


Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
May 4	96.5	102.0	97.0	99.5*	98.0	104.5	98.0	99.0	102.0	93.5	104.0	96.0*	96.0	99.0*
May 11	95.5	101.5	103.5	101.0	96.0	104.5	99.0	97.0	101.0	84.0	100.0	99.0	97.0	99.0

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Reconversion Plan Revealed By Maverick May Be Placed Into Effect Next Autumn

Washington

• • • SWPC Director Maury Maverick on May 3 announced a reconversion plan which other WPB officials predict will be put into effect by September. The plan is a combination of the regional surplus plan and the plan to employ Area Production Urgency Committees in shifting to peace production.

The regional surplus plan would be applied in loose labor areas. Essential non-military production authorized by civilian agencies would be assigned to the maximum extent possible to small plants in Group III and IV labor areas.

The requirements that cannot be filled in small plants in loose areas shall then be directed to small plants in the tighter labor areas to the extent possible, and such plants shall be exempt from all WPB civilian manufacture restrictions according to the following formula:

1. No. I areas—All plants employing 100 wage earners or less to be fully exempt. Build up of working force to 100 allowed.

2. West Coast area—Plants employing 50 or less wage earners to be fully exempt. Any increase above present employment would be subject to approval by Area Production Urgency Committees.

These committees are composed of representatives of all procurement agencies, and at present have authority to trouble shoot war production problems through recommending contract shifts and various manpower relief remedies. Officials say they have proved to be especially competent by reason of the fact that they are fully acquainted with local conditions.

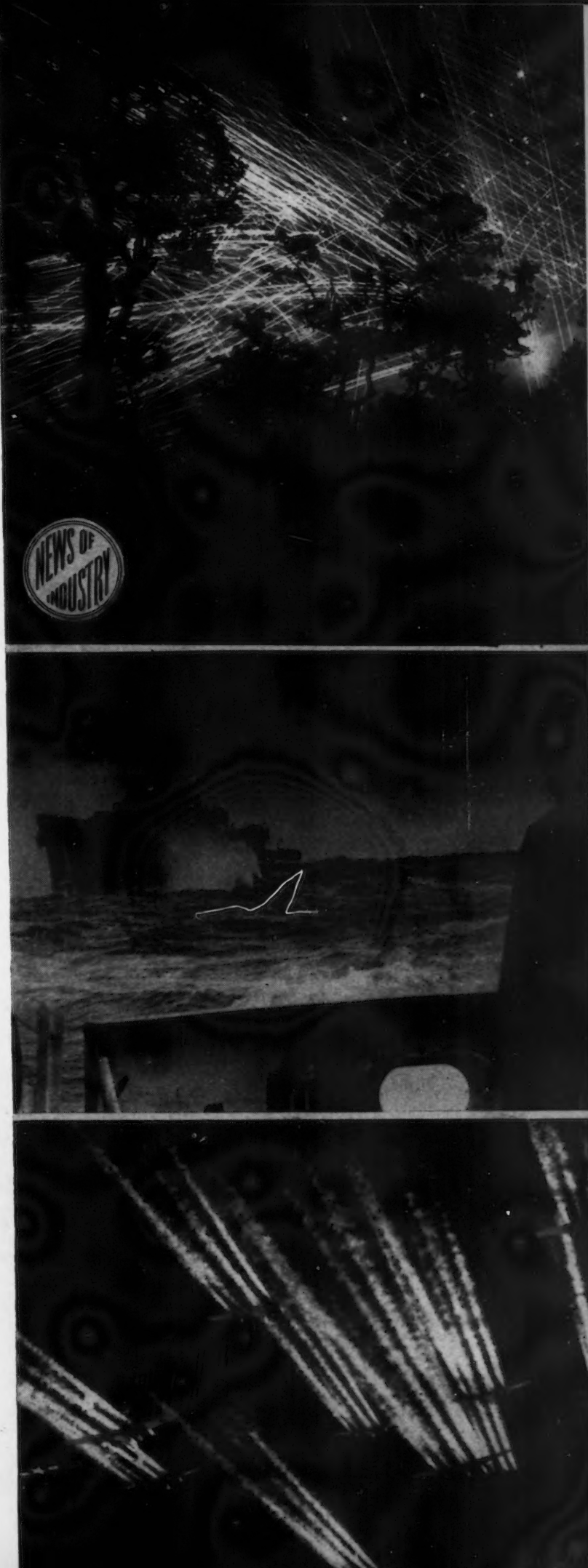
3. Other areas having area production urgency committees—Plants employing 100 or less wage earners to be fully exempt as to present employment. Any increase above present employment would have to be approved by the APUC.

4. No. II areas—All plants employing 200 wage earners or less to be fully exempt. Build up of working force to 200 allowed.

Mr. Maverick testified before the Military Affairs (Senate) subcommittee that holding up small plants from reconversion is an open invitation to economic disaster. He expressed the opinion that the 2000 to 3000 dominant units of industry will have very little difficulty in surviving the reconversion period and added that the severest punishment and real difficulties will beset the thousands of smaller concerns.

"The notion voiced by some people that small concerns should be barred from entering civilian production—even when people need the goods and the production is not harmful to the war effort, and all for fear that they will gain a competitive ad-

WAR'S TRAILS:
Ack-ack tracer fire against Jap bombers makes a pretty pattern in top photo. On the sea (middle) Coast Guard cutters plough through rough seas on convoy duty. At the bottom are eerie vapor trails from an air armada bound for Berlin from Britain.



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vantage over their business competitor, points the road to ruin for small business in this country," Mr. Maverick said.

Declaring the reason cutbacks have not meant additions to the labor force can be attributed to large firms pulling back work formerly done by suppliers, thus contributing to unemployment in loose labor areas, Mr. Maverick pointed out that some firms on cost plus a fixed fee basis do not

let go of their people when contracts are terminated.

If APUC's were given power to adjust non-military production in tight labor areas, and firms in loose labor areas were permitted to resume production on a limited basis the path transition from war to peace would be smoothed with a minimum of unemployment, idle factories and small business mortality, according to Mr. Maverick.

Delay in Surplus Legislation Urged

Washington

• • • Surplus War Property administrator Will L. Clayton last week told the War Contracts Subcommittee of the Senate Military Affairs Committee that immediate action on surplus property legislation is unnecessary and asked for more time to study the problem before making recommendations to Congress. He pointed out that the urgent legislative task relates to the termination of contracts and not to property disposal.

Mr. Clayton pointed out reasons for the belief that surplus property legislation should be delayed. These were: 1—There is currently a period of short supply and agencies involved have powers adequate to permit disposal of the surplus, and 2—it was

not felt by Mr. Clayton that he is competent at the present time to recommend legislation as to the important postwar policy problems or event as to the prior questions of marketing and pricing policy.

There are several aspects of the disposition problem, Mr. Clayton pointed out, upon which Congress should express its will. These are:

1—what agency will have overall direction and supervision over surplus disposal; 2—agencies authorized to sell should be given power to pass valid legal title; 3—a program for preferential treatment of purchasers; 4—proposals for restriction on the sale of various classes of property; 5—authority to extend credit to purchasers; 6—disposal of property abroad with measures to prevent its re-entry into this country; 7—acquisition of property by speculators, profits realized therefrom, and misrepresentations to the public; and 8—the desirability of legislation on such matters as price and methods of sale of the property.

As to the Surplus Property Administration, its activities have been confined to the formulation and distribution to the procurement agencies of price policies; establishment of a clear cut segregation of the various types of property; organization of disposal agencies on a regional basis; and other such phases.

Divorce Enterprises, Pullman Ordered

Philadelphia

• • • In a decision by the District Court at Philadelphia, a three-judge Federal panel ordered Pullman, Inc., to separate "completely and perpetu-

ally" its railroad car building business from its sleeping car enterprise. The court upheld the government's contention that the Pullman companies and its 31 officers and directors violated the Sherman Anti-Trust Act through the operation of a complete monopoly, and gave Pullman, Inc., the top holding company, the choice of operating either its sleeping cars or its car manufacturing business but not both.

This decision follows a 2½ year suit by the government and becomes effective within 60 days unless an appeal is carried to the United States Supreme Court, an action that is almost a certainty. At the same time, Pullman, Inc., was given 90 days to make a choice as to future corporate standing and file a plan for hearings and approval to effectuate the separation of its business. After such an approval by the court, Pullman, Inc., will be given one year in which to carry out the separation of its enterprises and to abide by the provisions of the order.

The court order directs that Pullman, Inc., divest itself of control over one of its two associated units, the Pullman Co., which operates the sleeping car business; or Pullman-Standard Car Mfg. Co., which, with its subsidiary, Pullman Car and Mfg. Corp. of Alabama, builds railroad cars.



NAVY BIG GUNS: These big guns of a U. S. Navy battleship point menacingly as the ship smashes along in heavy seas.

Hardenability Basis for Sale Of Alloy Steel Expected To Be Adopted

St. Louis

••• Makers of alloy steel within a few months are expected to begin accepting orders on a hardenability basis for three types of alloy steel. These are the NE 8600, NE 8700, and SAE 4300 grades. Acceptance of orders on the hardenability basis for other types is contemplated later, and may eventually encompass the entire range of alloy steels.

This revolutionary action follows a long series of tests by alloy producers in which hardenabilities of heats of a given type of chemical composition were classified, and the results charted against customer requirements. Melters discovered that they could find a customer for approximately 97.5 per cent of heats falling in the middle one-third of the hardenability range, plus or minus two Rockwell C points, of a given type of steel. The outer limits of this entire hardenability range are bounded by hardenability curves calculated on the assumption of maximums of all alloying elements and minimums of all alloying elements, respectively.

Under the new program, a customer may place an order for a steel of a certain hardenability, chemical composition limited only by the specification that it falls in, for instance, the NE 8700 series. The mill will guarantee that the steel supplied meets the hardenability range specified. In the currently customary buying of alloy steel on the basis of chemical composition alone, the prospective heat treater runs the risk that the steel which he receives may lean heavily toward the outer boundaries of the permissible analysis range and that grain size and uncontrollable factors may combine to invalidate a normal heat treat cycle calculation.

Sales already have been made by mills on the basis of hardenability in isolated instances. One involved shot steel for Navy contracts, with orders placed principally in the Pittsburgh district.

Because hardenability is not always the controlling factor in alloy steel purchasing, and because many users are not yet fully acquainted with the use of hardenability data, it is not contemplated that the majority of orders will immediately switch to placement on the hardenability basis. By specifying the general series number, however, those who buy on the

basis of hardenability will retain substantial control over the other physical properties of the steel which they buy.

Steel and Coal Strikes Hit Production

Pittsburgh

••• A series of strikes last week in this district, involving steel plants and coal mines, cut into direct war production involving such items as LST's, vitally needed for the armed forces, and important war steel.

Jones & Laughlin Steel Corp. in the past week was hit by outlaw strikes at its Aliquippa and its Pittsburgh Works, both stoppages losing vital war material. A strike at the Aliquippa Works, which lasted for a short time, shut down four out of five blast furnaces, while early this week 12 CIO easthouse men at the Pittsburgh Works blast furnaces ended a four-hour strike. This latter stoppage temporarily shut down three out of six blast furnaces.

According to officials, the last strike at their plant was the 43rd one to hit Jones & Laughlin plants in Pittsburgh and Aliquippa since the first of the year. The recent disturbance was said to have occurred as a result of "tardi-

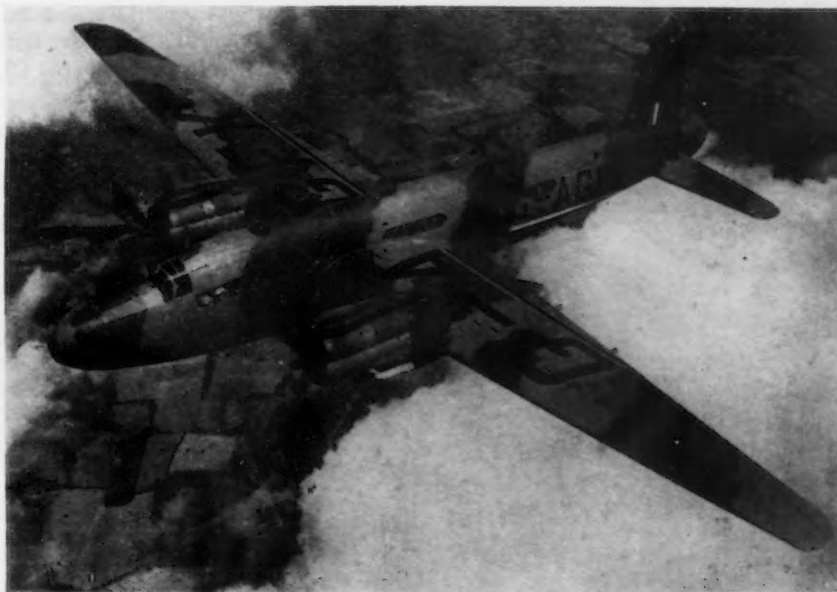
In connection with hardenability buying, Joseph T. Ryerson & Son Inc., steel warehouse firm, for about a year has been accompanying each shipment of alloy steel to its customers with a data sheet showing end quench hardenability of the steel in the as-quenched condition and also following draws at 1000, 1100, and 1200 deg. F.

ness" of the WLB in handling wage grievances.

A strike that cost the United States Navy at least one LST was ended early this week, when 600 members of the AFofL Pipe Fabrication Shop Employees returned to work at Blaw Knox Steel Co's Pittsburgh and Etna units of the National Valve Co., and the Pittsburgh Piping Co. These men, it was said, were working on special pipe sizes and grades which form an integral part of the LST's.

Meanwhile, five Western Pennsylvania coal mines resumed operations early this week after miners went back to work. These tieups, it was said, were in part the result of the refusal of inspectors to make State required daily inspections of the mines. Other miners that had been on strike also returned, after disputes involving such items as conveyor wages and indignation over alleged transfers of employees, were sent to proper authorities.

BRITISH TRANSPORT: This Vickers Warwick in the RAF service as a passenger-cargo transport. It is powered by two Pratt & Whitney double Wasp engines, and take its origin from the Wellington.



War Department Issues Rules On Removal of Materials and Machinery

DONALD BROWNE

Washington Staff

Washington

• • • The War Department recently has formulated regulations to control removal of materials and machinery in plants of all types of contractors and subcontractors where contracts are terminated except government-owned plants. The regulations, contained in Section VI-A of Procurement Regulation 15, governing termination of contracts, do not cover the handling in final settlement agreement of property which for any reason cannot be removed or stored with the contractor at the time of the execution of the agreement.

The new regulations incorporate the recommendation of the Baruch-Hancock report of Feb. 15, and the policy statement of the Joint Contract Termination Board with respect to plant clearance. The rights and liabilities of contractors, the government, and third persons are dealt with after termination of contracts with respect to:

- (1) When property must be removed.
- (2) What the contractor must do to get rid of property.
- (3) When the contractor may store property at his own risk and expense, and when at the government's.
- (4) What adjustment the government makes when it removes property from the plant of a contractor through mistake.
- (5) Storage agreements, including tax-exempt compensation to the contractor by the government, after title has passed to the government, and the responsibility of the contractor thereafter for loss or damage to the property, where property is stored on the contractor's premises.
- (6) Storage arrangements with government owned or leased installations, and with commercial warehouses.
- (7) When title passes to the government, and what the contractor must certify with respect to liens and encumbrances, in tendering title.
- (8) Scrap determination prior to removal.
- (9) Instructions to contractors for the preparation of inventory

lists. (10) Maintenance of property accounts records by accountable property officers. (11) Verification of property quantities by contracting officer. (12) Financial responsibility of contracting officers. (13) Shipping documents. (14) Shipment discrepancies, and receipts.

In general the regulation provides that the procedures pertaining to the foregoing subjects governing fixed price contracts control subcontracts, and cost plus fixed fee subcontracts, as well as cost plus prime contracts.

These procedures will be applied in connection with any property the fixed price prime contractor has on hand at the time of the execution of the final settlement agreement, and which is to be taken over by the government. The procedures may also be employed in connection with property which a fixed price subcontractor still has on hand at the time of final settlement with him which is approved by the contracting officer and the form of the storage agreement (including deletion of the provisions by which the government reserves the right to contest allocability to the contract) may be executed directly with the subcontractor, without liability of the prime contractor with respect of the subcontractor's performance of his obligations under the storage agreement.

Although contractors have the right under the regulation to remove property from their plant as soon as termination notice is received at their own risk, few contractors will wish to take the risk. Manufacturers also have the privilege upon termination, after having submitted inventory lists on Inventory Schedules Numbered C1,

C2 and C3 (Forms WD. AGO. 247-8-9) at the expiration of 60 days to store property at the expense and risk of the procuring agency either on their own premises or elsewhere, provided in either case the contractor takes reasonable precautions for protection of the property and notifies the procuring agency of the action.

The new regulation encourages contractors and contracting officers to get rid of such property quickly to make it available for other production use, and says that the inventory lists should be submitted "without waiting to obtain more complete information than that necessary to meet the minimum requirements for property disposition." Contracting parties are urged not to wait for the expiration of the 60-day period, "to make an effort to dispose of the property with reasonable dispatch."

If after the original submission of inventory lists, and at the end of 60 days property chargeable to the government on a particular terminated contract has not been removed, the contractor should transmit to the appropriate contracting officer a demand for removal of property accompanied by inventory lists, etc.

The regulation approves the foregoing steps as a valid tender of title by the contractor, and the property will be removed promptly, or a storage agreement will be entered into by the contracting officer with the contractor.

Liability for loss or damage to property is placed upon the contractor until the officer of the technical service involved gives the contractor a receipt, which is then unconditional, and removes the property.

Where it is determined prior to final settlement that the government has removed or disposed of property which is not allocable to the terminated portion of the contract, then the government in arriving at the amount of the final settlement will take into account either the disposal value of the property at the time of removal or the proceeds realized from the sale of the property, or will return the property to the contractor at government expense, all at the election of the government; and after final settlement the contractor will have no claim against the government by reason of any removal or disposition.

Compensation to be paid the contractor for storing the property is exempted from transportation or storage taxes due on the date of the contract or imposed by federal, state or local law thereafter.



PRODUCTION SPEED-UP: With electronic control of this winding machine, the production of capacitors has been increased and spoilage of this critical metal foil has been cut. Even a beginner operating this winding machine, according to Westinghouse, can produce as many in one day as 24 operators can wind by hand.

Progress of Steel Expansion Program

Additions Already Made or Under Way Nov. 1, 1943, in Iron Ore, Sintering, By-Product Coke, Blast Furnace, Open Hearth and Electric Furnace Capacity
(Thousands of Net Tons)

COMPANY	PLANT	BLAST FURNACES			OPEN HEARTH FURNACES			ELECTRIC FURNACES		
		Originally Scheduled	Operation Started	Schedule as of Nov. 1, 1943	Originally Scheduled	Operation Started	Schedule as of Nov. 1, 1943	Originally Scheduled	Operation Started	Schedule as of Nov. 1, 1943
American Rolling Mill Co.	Ashland, Ky. Hamilton, Ohio Middletown, Ohio	430 (8-42) 19 (10-42)	430 (8-42) 19 (10-42)					43 (8-42)	28 (6-42) 11 (4-43)	
Armco-Sheffield Steel Co.	Houston	274 (2-43)		274 (12-43)	202 (4-42) 305 (1-43)	202 (5-42) { 70 (7-43) 70 (9-43)	165 (12-43)			
American Steel & Wire Co.	Donora, Pa. Duluth, Pa. Worcester	259 (12-42)	259 (2-43)		88 (6-42) 26 (2-42) 36 (4-43)	60 (9-43) 26 (2-42) 20 (10-43)				
Andrews Steel Co. Babcock & Wilcox Co.	Newport, Ky. Beaver Falls, Pa.							242 (5-43) 24 (4-42) 24 (8-42)		195 (2-44) 25 (7-42) 25 (8-42)
Barium Stainless Steel Co.	Canton, Ohio				18 (1-42) 30 (9-42)	18 (1-43)	30 (11-43)			
Bethlehem Steel Corp.	Bethlehem Johnstown, Pa. Lackawanna, N.Y. San Francisco Seattle	432 (10-42) 54 (9-42) 432 (11-42)	432 (7-43) 54 (9-42) 432 (6-43)		300 (9-42) 100 (12-42) 60 (11-42) 60 (10-42)	{ 150 (1-43) 150 (2-43) 100 (12-42) 55 (12-42) 45 (12-42)				
Braeburn Alloy Steel Co. Byers, A. M.	Braeburn, Pa. Economy, Pa.				36 (1-42) 36 (5-43)	36 (1-42)	36 (11-43)	9 (7-42) 8 (7-42) 72 (4-43) 12 (2-43)	9 (7-42) 8 (7-42) 36 (9-43) 12 (2-43)	36 (11-43)
Cabot Shops Carnegie-Illinois Steel Corp.	Pampa, Texas Braddock, Pa. Chicago District Clairton, Pa. Duquesne, Pa.	457 (2-43) 458 (3-43)	457 (7-43)	458 (11-43)	289 (2-42) 150 (12-42)	289 (2-42) 150 (3-43)				
	Gary, Ind. Homestead, Pa.	200 (11-42)	200 (7-43)		474 (11-42) 474 (12-42) 792 (6-43)	475 (6-43) 158 (7-43) { 316 (8-43) 158 (9-43) 316 (10-43)	317 (11-43)	35 (9-42) 130 (1-43)	35 (11-42) { 62 (4-43) 62 (7-43)	
	Mingo Junction, O. Pittsburgh	32 (12-42)	32 (1-43)		30 (3-42) 24 (10-42)	30 (3-42) 24 (10-42)				
	Rankin, Pa. So. Chicago, Ill. Youngstown	14 (2-43) 25 (6-43)	14 (2-43) 25 (6-43)		40 (7-43) 40 (2-44)	25 (6-43)	55 (2-44)	65 (5-43)	60 (7-43)	
Carpenter Steel Co. Central Iron & Steel Co. Colorado Fuel & Iron Corp. Columbia Steel Co.	Reading, Pa. Harrisburg, Pa. Pueblo, Colo. Ironton, Utah	227 (1-42) 11 (2-42) 300 (12-42)	227 (1-42) 11 (2-42) 300 (7-43)		36 (8-42)	36 (8-42)		7 (10-42)	7 (10-42)	
	Pittsburg, Calif. Torrance, Calif. Birmingham, Ala. Warren, Ohio				60 (5-42)	60 (12-42)		3 (12-42) 4 (12-42) 36 (3-42) 60 (5-42) 60 (7-42) 144 (12-42) 60 (3-43)	3 (12-42) 4 (12-42) 36 (3-42) 46 (6-42) 46 (7-42)	150 (11-43)
Connors Copperweld Steel Co.	Harrison, N. J. Syracuse Pittsburgh Pittsburgh Philadelphia Oakmont, Pa. Geneva, Utah				32 (7-42)	32 (7-42)		59 (3-42) 7 (7-42) 3 (6-42) 4 (1-42) 2 (7-43)	59 (3-42) 7 (7-42) 3 (6-42) 4 (1-42) 2 (7-43)	
Crucible Steel Co. of America: Atha Works Halcomb Works Park Works La Belle Works Disston, Henry & Sons Edgewater Steel Co. Geneva Steel Co.	Harrisburg, Pa. Pittsburgh Pittsburgh Philadelphia Oakmont, Pa. Geneva, Utah	57 (12-42)	57 (12-42)		50 (12-42) 1300 (5-43)	50 (12-42)		433 (12-43) 433 (2-44) 434 (3-44) 300 (11-43)		
	Granite City, Ill. Detroit Harrisburg, Pa.	37 (8-43)	37 (8-43)		300 (2-43)	14 (7-42)				
Granite City Steel Co. Great Lakes Steel Co. Harrisburg Steel Co. Ingersoll Steel & Disk Co. Inland Steel Co.	New Castle, Ind. Indiana Harbor, Ind.	44 (7-42) 427 (11-42) 73 (5-43) 450 (4-43) 450 (5-43) 48 (6-42)	44 (7-42) 427 (11-42) 73 (10-43) 450 (12-43) 450 (6-44)		50 (2-43)	50 (2-43)		4 (9-42)	4 (7-42)	
Interlake Iron Co. Isaacson Iron Works	Chicago Seattle							75 (8-43)	{ 37 (8-43) 38 (10-43)	
Jessop Steel Co.	Washington, Pa.							12 (4-42) 12 (7-42) 12 (12-42)	12 (4-42) 12 (6-42) 12 (1-43)	
Jones & Laughlin Steel Corp.	Pittsburgh Riverside Plant, Cleveland	120 (4-42) 108 (4-43) 185 (7-43)	120 (7-42)	108 (1-44) 185 (12-43)	70 (10-42) 54 (12-42)	54 (12-42)	70 (3-44)			

Progress of Steel Expansion Program—Continued

COMPANY	PLANT	BLAST FURNACES			OPEN HEARTH FURNACES			ELECTRIC FURNACES		
		Originally Scheduled	Operation Started	Schedule as of Nov. 1, 1943	Originally Scheduled	Operation Started	Schedule as of Nov. 1, 1943	Originally Scheduled	Operation Started	Schedule as of Nov. 1, 1943
Joslyn Mfg. & Supply Co. Kaiser Steel Co., Inc.	Fort Wayne, Ind. Fontana, Calif.	432 (12-42)	432 (1-43)		429 (3-43)	{ 214 (5-43) 215 (6-43)	246 (11-43)	18 (9-42) 30 (12-43)	9 (9-42)	30 (12-43)
Kilby Steel Co.	Anniston, Ala.				246 (5-43) 44 (6-42)	48 (6-42)				
Koppers Co.	Granite City, Ill.	242 (8-42)	242 (1-43)		40 (1-42)	40 (6-42)				
Laclede Steel Co.	Alton, Ill.									
Lone Star Steel Co.	Daingerfield, Tex.	432 (7-43)		432 (1-44)						
McCrossin Engr. Co.	Rusk, Texas	36 (1944)		36 (1944)						
Mesta Machine Co.	W. Homestead, Pa.							16 (3-43) 90 (6-43)	16 (3-43)	90 (11-43)
National Supply Co.	Torrance, Calif.							7 (11-42)	7 (11-42)	
National Tube Co.	Lorain, Ohio	163 (7-42)	105 (7-42) 58 (10-42)		147 (2-42)	147 (2-42)				
Newport News Ship- building Co.	Pittsburgh							2 (4-43)	2 (4-43)	
Northwestern Steel & Wire Co.	Newport News, Va.							108 (7-42) 30 (9-42)	108 (7-42) 30 (6-43)	
Oregon Electric Steel Co.	Sterling, Ill. Portland, Ore.							30 (6-43) 54 (2-42)	30 (6-43)	30 (11-43)
Pacific States Steel Co.	Niles, Calif.				60 (4-44)		60 (4-44)			
Phoenix Iron & Steel Co.	Phoenixville, Pa.									
Pittsburgh Coke & Iron Co.	Neville Island, Pa.	43 (9-42)	43 (10-42)							
Pittsburgh Ferro- manganese Co.	Chester, Pa.	127 (7-42)	127 (7-42)							
Pittsburgh Steel Co.	Monessen, Pa.	432 (3-43)		432 (12-43)	68 (3-43)		68 (12-43)	191 (3-42)	221 (3-42)	
Republic Steel Corp.	Canton, Ohio									
	Chicago	450 (3-43)		450 (2-44)						
	Cleveland	450 (5-43)		450 (11-43)						
	Gadsden, Ala.	280 (5-42)	280 (5-42)					166 (8-42) 584 (5-43)	167 (4-43) 167 (7-43)	
	So. Chicago, Ill.							167 (9-43)		249 (11-43)
Rotary Electric Steel Co.	Youngstown	392 (9-42)	392 (10-42)							
	Detroit							25 (2-42) 2 (2-43) 56 (5-43)	25 (2-42) 2 (2-43) 56 (7-43)*	
Sharon Steel Co.	Lowellville, O.				40 (7-42)	40 (7-42)				
Sheffield Steel Co.	Kansas City				72 (4-42)	85 (5-42)				
Shenango Furnace Co.	Sharpsville, Pa.	23 (5-42)	23 (5-42)							
Tennessee Coal, Iron & Railroad Co.	Birmingham	354 (3-42)	354 (3-42)		216 (4-42)	218 (4-42)				
	Ensley, Ala.	11 (6-42)	11 (6-42)					14 (4-42)	14 (4-42)	
Texas Steel Co.	Fort Worth, Tex.									
Wheeling Steel Corp.	Steubenville, Ohio	70 (6-43)		70 (3-44)						
Wickwire Spencer Steel Co.	Harriet, N. Y.	27 (3-42)	27 (3-42)							
Vanadium Alloy Steel Co.	Latrobe, Pa.							4 (7-42)	4 (7-42)	
Youngstown Sheet & Tube Co.	Campbelle, Ohio	44 (9-42) 137 (10-42)	44 (9-42) 137 (10-42)							
	Hubbard, Ohio	16 (10-42)	16 (10-42)							
	Indiana Harbor, Ind.	60 (6-42)	60 (6-42)		102 (3-42) 36 (11-42)	102 (3-42) 36 (11-42)		120 (10-42)	120 (5-43)	
	Youngstown	38 (10-42)	38 (10-42)							
	Totals	11,133	6168	4945	7155	4463	2647	2719	1915	830

* No increase in capacity reported after project was completed.

Steel Expansion Program Notes

• The progress of the steel expansion program, as reported by the WPB after a complete examination of this program from its inception to Nov. 1, 1943, indicates that on the whole, it was about two-thirds completed at that time. However, since Nov. 1, 1943, some additional facilities that have been under construction have been placed in operation.

• The blast furnace expansion program originally planned for the increase of blast furnace capacity by some 11,133,000 net tons. By Nov. 1, 1943, 6,188,000 tons of this added capacity was in operation with 4,945,000 tons more to be added to capacity either in late 1943 or early 1944. By far the biggest single project under the blast furnace program was the construction scheduled at the Geneva Steel Co.'s new plant at Geneva, Utah, where capacity was to total 767,000 net tons per year. On Nov. 1, 1943, none of this capacity was in operation, but half was to be in operation in December, 1943, and half in January, 1944. Some delays, however, held up completion of this project on schedule.

• Of some 46 expansion projects for open hearth steel-making capacity, totaling about 7,155,000 net tons, about 3/4 were completed by Nov. 1, 1943, with 4,463,000 net tons capacity in production. Again, for a single works, Geneva Steel Co., had the largest single project, with capacity scheduled for 1,300,000 net tons. All of this capacity was scheduled for completion after Nov. 1, 1943, with about one third coming into operation in December, 1943, another third in February, 1944, and another third in March, 1944. The Homestead, Pa., works of Carnegie-Illinois Steel Corp. has a three unit project that will increase the open hearth capacity of this works by some 1,740,000 net tons, and all but about 317,000 net tons were in operation on Nov. 1, 1943. The balance was scheduled to be in production later that month.

• There were 50 electric furnace projects started as war measures in the United States, and by Nov. 1, 1943, 42 of the projects were in operation. The added electric furnace steel capacity scheduled will total 2,719,000 net tons and the capacity that was in production on Nov. 1, 1943, totaled 1,815,000 net tons.

Progress of Raw Materials Expansion Program

• To supply raw materials for the increased production of iron and steel under the WPB steel expansion program, a plan for increasing the capacity of iron ore mines, sintering plants, and coke ovens was also inaugurated. Iron ore production was scheduled to be increased by 13,739,000 net tons; sintering plant production by 9,824,000 net tons; coke oven output by 7,718,000 net tons. By Nov. 1, 1943, iron ore projects completed accounted for 5,311,000 net tons of capacity; sintering plant capacity added totaled 5,841,000 net tons; and coke oven capacity had been increased by 4,248,000 net tons.

• Sintering plant projects, of which there were 22 scheduled, were concentrated mainly in five companies. Republic Steel Corp.'s capacity was increased 2,189,000 net tons; Jones & Laughlin Steel Corp. was scheduled

for 1,258,000 net tons; Youngstown Sheet & Tube Co.'s capacity was scheduled to be upped 1,020,000 net tons; Colorado Fuel & Iron Corp., had 720,000 net tons of sintering capacity scheduled for construction; and American Rolling Mill Co., had another 540,000 net tons scheduled for construction. These alone account for more than 5,000,000 of the 9,824,000 net tons of sintering capacity scheduled for completion.

• Coke oven projects scheduled for construction by the WPB numbered 24, with one of these being a replacement, not increasing capacity. This latter was the project at Colorado Fuel & Iron Co.'s plant at Pueblo, Colo. Eleven projects are completed or partially in operation, accounting for 4,248,000 net tons of the 7,718,000 net tons scheduled for construction.

COMPANY	PLANT	IRON ORE MINES			SINTERING PLANTS			COKE OVENS		
		Originally Scheduled	Operation Started	Schedule as of Nov. 1, 1943	Originally Scheduled	Operation Started	Schedule as of Nov. 1, 1943	Originally Scheduled	Operation Started	Schedule as of Nov. 1, 1943
American Rolling Mill Co.	Hamilton, Ohio				540 (12-42)	540 (4-43)				
Armco-Sheffield Steel Co.	Atlanta and Jacksonville, Texas	480 (5-43)		480 (12-43)				275 (3-43)		245 (11-43)
Bethlehem Steel Corp.	Bethlehem, Pa.				360 (8-42)	360 (8-42)		439 (3-43)	433 (5-43)	
	Lackawanna, N. Y.							365 (4-43)	365 (8-43)	
	Steelton, Pa.									400 (11-43)
Carnegie-Illinois Steel Co.	Gary, Ind.							400 (6-43)		
Cleveland Cliffs Iron Co. (Mather Shaft)	Ishpeming, Mich.	500 (5-44)		500 (5-44)						
Colorado Fuel & Iron Corp.	Pueblo, Colo.				720 (6-43)	720 (10-43)		320 (5-44)*		327 (7-44)*
Columbia Steel Co.	Cedar City, Utah	550 (1-43)	550 (1-43)		300 (5-43)	330 (8-43)				
	Ironton, Utah									
Donner Hanna Coke Corp.	Buffalo							90 (11-43)		90 (12-43)
Geneva Steel Co.	Cedar City, Utah	2100 (12-42)	2100 (8-43)							
	Geneva, Utah				300 (5-43)		800 (11-43)	251 (4-43)		251 (11-43)
	Geneva, Utah							503 (6-43)		252 (12-43)
	Geneva, Utah									251 (1-44)
	Geneva, Utah							252 (9-43)		252 (2-44)
M. A. Hanna Co.	Clifton, N. Y.	300 (9-42)	300 (9-42)							
Inland Steel Co.	Indiana Harbor, Ind.				432 (5-43)	432 (10-43)		800 (5-43)	399 (8-43)	399 (11-43)
Interlake Iron Co.	Chicago				224 (9-42)	224 (9-42)				
	Erie, Pa.							157 (10-43)		202 (11-43)
	Toledo, Ohio				224 (8-42)	224 (8-42)				
Jones & Laughlin Steel Corp.	Benson Mines, N.Y.	800 (7-43)		1000 (12-43)	700 (7-43)		700 (12-43)			
	Pittsburgh				558 (3-43)		558 (1-44)			
Kaiser Steel Co., Inc.	Fontana, Calif.				467 (3-43)	467 (3-43)		340 (12-42)	390 (12-42)	
	Kelso, Calif.	756 (11-42)	756 (11-42)							
Koppers Co.	Kearney, N. J.							375 (7-44)		375 (7-44)
Koppers United	Granite City, Ill.							305 (12-42)	305 (3-43)	
K. W. D.	Sullivan, Mo.	25 (4-42)**	25 (4-43)**							
Lone Star Steel Co.	Daingerfield, Tex.	778 (7-43)		778 (12-43)	255 (8-43)		255 (12-43)	375 (6-43)		375 (12-43)
National Lead Co.	McIntyre, N. Y.	600 (7-42)	600 (8-42)							
	Tahawus, N. Y.				630 (12-43)		630 (2-44)			
Ozark Ore Co.	Iron Mountain, Mo.	300 (6-44)		300 (6-44)						
Penn Iron Mining Co.	Norway, Mich.	85 (2-43)	85 (2-43)							
Pickands-Mather Co.		1000 (3-43)								
Embarras Lake		2000 (4-40)		3000 (4-44)						
Pittsburgh Coke & Iron Co.	Biwabik, Minn.									
Pittsburgh Steel Co.	Neville Island, Pa.				45 (8-42)	45 (6-43)		220 (3-44)***		220 (1944)***
Republic Steel Corp.	Monessen, Pa.							460 (7-42)	484 (7-42)	
	Chicago				300 (4-43)		300 (12-43)	465 (6-43)		465 (11-43)
	Cleveland							465 (5-43)	465 (10-43)	
	Gadsden, Ala.							400 (1-43)	400 (1-43)	
	Mineville, N. Y.	1120 (1-43)	450 (7-43)	450 (4-44)	765 (6-43)	385 (7-43)	380 (4-44)			
	Port Henry, N. Y.				350 (3-43)	350 (4-43)				
	Snaulding, Ala.	470 (2-43)	470 (7-43)		382 (3-43)	382 (6-43)		375 (2-43)	375 (2-43)	
	Warren, Ohio				392 (3-43)	392 (4-43)				
Scotia Mining Co.	Youngstown									
Tenn. Coal, Iron & R. R.	Scotia, Pa.	400 (1-44)		400 (1-44)						
Warren Pipe, Mt. Hope No. 2	Birmingham, Ala.							375 (8-43)	375 (10-43)	
Weirton Steel Co.	Sharon, N. J.	600 (7-43)		408 (1-44)						
Wheeling Steel Corp.	Weirton, W. Va.				360 (6-43)			252 (4-42)	252 (4-42)	
Alan Wood Steel Co.	Steubenville, O.						360 (3-44)			
	Oxford, N. J.	200 (1-43)		200 (1-44)						
	Ringwood, N. J.	250 (7-43)		250 (6-44)						
Youngstown Mine	Rabbit Lake, Minn.	450 (6-44)		450 (6-44)						
Youngstown Sheet & Tube Co.	Youngstown				720 (10-42)	720 (10-42)		438***		438 (1944)***
	So. Chicago, Ill.				300 (7-42)	300 (7-42)				
Totals		13,739	5311	8216	9824	5841	3983	7718	4248	3557

* Replacement—does not result in increase in capacity.

** Mine has been standing idle since August 26, 1943. Project cancelled.

*** Projects approved but no construction will be undertaken until conditions are satisfactory to operators.

Retain DPC Plants As Insurance, Admiral Hussey Will Recommend

San Francisco

• • • Paying the high tribute that the greatest single debt the country owes today is due the manufacturers who produced the machine tools which have enabled other manufacturers and their confreres to do such a splendid job for the country, Rear Admiral George F. Hussey, Jr., chief of the Bureau of Ordnance, in an address on Tuesday before the National Association of Manufacturers, discussed the Navy's post war ordnance plans and its policy regarding termination of contracts.

Speaking of newly built government owned and privately operated Naval ordnance plants and other plants for very specific purposes, government built and privately controlled and operated, the Admiral said that it will be his recommendation to the Secretary of the Navy that these plants be retained to form the backbone of the standby Ordnance plant installation. Whether those plants should be operated or whether they should be laid up "in grease," he said, will depend entirely upon the size of the Navy which national policy dictates must be retained after the peace treaty is signed.

The Admiral declared that while it is too early for the Bureau of Ordnance to make a flat final statement of policy as to termination of contracts and reconversion of plants, the Navy's chief interest will be in settling all matters of contract termination and property disposal on the basis of fairness to both contractor and government. This, it was explained, was the position taken by the late Secretary of Navy, Frank Knox. It was pointed out that the Bureau's policy must stem directly from that of the Navy Department which in turn will be determined by whatever action Congress may take.

"I can assure you," said Admiral Hussey, "that it is not to the interest of the United States to see companies go to the wall as a result of cancellation or termination of wartime contracts with this Bureau (of Ordnance). Much effort is being devoted in the Navy to the formulation of proper plans and policies with a view to putting them into effect when legislative action has been completed. In each of these the Navy is endeavoring to emphasize prompt settlement. It must not be forgotten that to reach

a settlement promptly no little cooperation on the part of the contractor must be required. A considerable amount of supporting data will be necessary for making settlements, of course, but that policy is not to insist upon minutia, to squeeze the last drop of blood or the last penny out of termination. Currently, contracts are being terminated but not in very large number, and each such action is predicated on a change in the war situation."

It was stated that at the moment things are going well and that certain items are no longer required while others are required in smaller quantities than had been contemplated. On the other hand, the Admiral said, "our most active and ingenious researchers and developers are continually turning out new ideas which, as they prove to be successful, must be translated into production contracts." This was referred to as the balancing factor against the termination of other items. Those two

U. S. vs NAZI SHELLS: *This photo portrays vividly the difference in the big shells that are used on the American-Nazi front in Italy. The larger shell is the American 8-in. (200 mm.) and the smaller is the Nazi 170 mm. projectile. Some 14,000 captured pieces of enemy ordnance have been sent to the Proving Ground at Aberdeen, Md. for testing and study.*



elements, the Admiral said, combined with increases due to the needs of the rapidly growing fleet, indicate that for probably another year at least, the total dollar value of Ordnance procurement will remain at about a constant level.

Regarding disposition of plants, Admiral Hussey said that the Navy's decision will have to be implemented by Congressional appropriations. It was stated that certain specialized machine tools, particularly adapted to Ordnance work and of relatively rare application to normal manufacturing needs, will probably be transferred from private plants to existing Naval establishments. Other machine tools, the Admiral told the meeting, will be utilized to retool the Navy's older plants such as the Naval gun factory, where much equipment is now outmoded and worn out.

"Many items in the machine tool category, I imagine," the Admiral said, "will be of interest to you, and there are many provisions in your contracts for their purchase. As a result of such dispositions, I do not anticipate that there will be a very large quantity of machine tools in the Ordnance field to be disposed of through the Property Disposal Organization, currently set up under Mr. Will Clayton.

"It is unlikely that there will be any substantial demand for the manufacture of ordnance during the early peace years, but I am in hopes that legislation and appropriations will be such, that the art of ordnance manufacture in commercial plants, at least, can be kept alive. Of even greater importance, however, is the question of research and development in ordnance. It is essential that funds be provided so that the Bureau may maintain its own small but competent laboratories, and, even more important, that it may place contracts for the solution of special problems with laboratories, both academic and commercial, best equipped in either personnel or facilities to solve the particular problem at hand. I cannot stress too strongly the importance of insuring adequate means for keeping our Navy not merely abreast of, but ahead of, the rest of the world in the development of new weapons and of means for their control. Before very long some such plan agreed upon by both the War and Navy Departments will probably be presented to Congress. When that time comes I hope that you gentlemen will be found earnestly supporting such a program."

WLB Lists Eight Rules for Customer Changes in Purchase Orders

Washington

• • • General rules governing the status of purchase orders that are changed by persons who originally placed them have been issued in Direction No. 1 to Priorities Regulation No. 1. The general rule is that a change in a customer's order constitutes cancellation of the order and must be considered as a new order received on the date of the change if, but only if, the change will require the manufacturer to interfere with his production.

If, under the application of this rule, a change constitutes a new order, the conditions existing at the time the changes are received govern the acceptance of the order and its sequence in delivery under Priorities Regulation No. 1. If a customer changes his order so that it constitutes a new order, but finds that as a new order it will not be scheduled for delivery at the time required, he may request reinstatement of his original order within 10 days of the date of cancellation of the original order. Rules that govern such reinstatement are shown in item No. 7, below.

To illustrate the operation of the rule governing changes in orders, the following eight cases are set forth in the direction:

1—A change in shipping destination does not constitute the placing of a new order.

2—An increase in the total amount ordered is a new order to the extent of the increase unless it can be filled with only a negligible interference with sequence of later orders.

3—A change in the date of the delivery, whether advanced or deferred, when made by the customer is a new order if it interferes with production, or delays delivery on an equal or higher rated order.

4—Mere substitution of one allotment-number for another, where there is no change in the accompanying rating, is not considered to be the placing of a new order.

5—A change in preference rating will not constitute a new order. Treatment of the new rating is governed by the provisions of Priorities Regulation No. 12.

6—A reduction in the total amount ordered will presumably not require a change in the manufacturer's sched-

ule and will not constitute a new order. If the quantity is reduced below a minimum production quantity, the manufacturer may insist on the delivery of not less than the minimum production quantity as explained in Interpretation No. 7. If the customer is not willing to order that amount, the manufacturer may reject the order. The manufacturer may not discriminate between customers in requiring delivery of minimum production amounts or in rejecting orders.

7—When the customer directs the manufacturer to hold or suspend production without specifying a new delivery date, the order must be considered canceled. If requested to do

so within ten days after receiving such an instruction, the manufacturer must reinstate the order as nearly as possible to its former place in his proposed schedule of deliveries as long as the reinstatement does not cause loss of production or delay in the scheduled deliveries on equal or higher rated orders. Any request for reinstatement made after ten days shall be treated as the placing of an entirely new order. The rule with respect to the effect of a request for reinstatement of an order which was part of a frozen schedule is stated in paragraph (d) of Priorities Regulation 18.

8—Where minor variations in size, design, capacity, etc., are requested by the customer and can be arranged by the manufacturer without interfering with his production, such changes do not constitute a new order.

Question Of Intent Debated at C-I Trial

Pittsburgh

• • • The question of whether there was criminal intent in the making of steel plate test records at the Irvin Works of the Carnegie-Illinois Steel Corp., has become a major issue in the Federal court trial of the company.

The company is being tried on two indictments, one containing 47 counts charging the company with furnishing government agencies with false heat numbers over a year ago, the other charging concealment and destruction of records.

Importance of the criminal intent issue was established when Judge Robert M. Gibson overruled the government attorney's objection to defense questioning, designed to show that Irvin Works employees had no feeling of guilt and no intention to defraud when they "made up" chemical analyses of steel whose heat identity had been lost.

Federal Attorney Robert L. Wright maintained that the point at issue is the "intent to give a wrong number

in order to cover up the fact that identity has been concealed." Judge Gibson, however, asserted that the government charges, in effect, an intent to defraud.

"It may be wrong," he added, referring to alleged falsification of records, "But there may be no actual intent to defraud, as charged in the indictment."

Since the trial opened May 1, several members of the Irvin Works metallurgical department have taken the stand to admit making analyses and physical tests conform to customers' specifications, when heat numbers and test specimens were lost. They explained it was impossible, in most cases, to trace the heat numbers to the originating furnace or to obtain test strips for plates that were ready to be shipped.

Defense Attorney Elder W. Marshall drew from Rudolph Halley, assistant to the chief counsel of the Truman Committee, and from H. Leroy Whitney, technical adviser to the chairman of the WPB, an admission that they deceived J. L. Perry, president of Carnegie-Illinois, as to the purpose of a visit to Irvin on March 16, 1943. They told Mr. Perry, they testified, that they wanted to visit a modern steel plant to give Mr. Halley an opportunity to learn something about steel making, to help him in preparing various reports. It was not until Mr. Halley began to question employees and examine records that Carnegie-Illinois officials knew an investigation was under way.

CMP Developments

Repair work—The purchase of up to \$25 worth of material is permitted for the installation of cooking, plumbing, heating or used air conditioning or refrigeration equipment, on condition that the use is not otherwise prohibited. Reg. No. 9A.

Surplus materials—Instructions and procedures for the diversion of surplus material are being formulated in order to streamline the methods whereby contractors can put those surpluses into production of civilian type goods. Dir. to CMP Reg. 1.

Manpower Is Key to Meeting Bearing Demands in Larger Sizes

Washington

• • • Although deliveries of small ball bearings, including specialized aircraft bearings, have improved, deliveries on medium and heavy ball bearings (30 to 170 mm. o.d.) continue critical, the Tools Division of WPB reported. The medium and heavy ball bearings are needed particularly in the Navy program, in the high tenacity rayon and synthetic rubber programs, and in the production of trucks and farm equipment. These bearings are produced principally in the Connecticut Valley.

While deliveries of specialized types of aircraft bearings such as airframe (control) bearings, and engine and propeller bearings are much improved, bearings for starters, hydraulic pumps, voltage regulators and other aircraft accessories continue tight since they are in the 30 to 170 mm. category.

Other items in short supply are large roller bearings such as the large tapered and straight roller bearings needed for big lathes involved in the heavy artillery and ammunition program and for marine propulsion equipment.

Spherical roller bearings are needed in the synthetic rubber program and for forging machines. The situation

in straight roller bearings has improved, but is still somewhat tight for truck bearings.

From May, 1943, until February, 1944, the production of 30 to 170 mm. ball bearings was below net orders and an increasing backlog of unfilled orders resulted. Shipments exceeded net orders during February and March of this year, but this trend must continue in order to meet requirements.

The backlog of orders for 30 to 170 mm. ball bearings at the end of Jan-

uary of this year was approximately 78,000,000 units, or about 10 months' production at the January production rate. This backlog dropped to about 76,000,000 units at the end of February, and to about 73,000,000 units at the end of March, or eight months' production at the March rate. Only part of this is past due.

Manpower is still the limiting factor in production, facilities available being adequate, the Tools Division reported. The continuance of relative balance between supply and demand on the types which have become easier and the improvement of the 30 to 170 mm. ball bearing groups depend, the division said, on manpower requirements being met.

"Special Sales" Rules Modified by WPB

Washington

• • • Rules governing special sales of small holdings of finished products under the terms of Priorities Regulation No. 13, have been modified. These rules, as amended May 1, permit the sale of finished products without preference ratings or special authorization if the total amount of all products of the same type and composition which the holder has is worth not more than \$100.

Changes have been made in List A which indicates the conditions under

which materials may be sold and List B which indicates conditions under which finished products may be sold.

One important change in List A permits the sale of aluminum in controlled material form without priorities to wholesale dealers who are regularly engaged in the business of selling aluminum. Furthermore, aluminum in other than controlled material forms and shapes may be sold without priorities to a user who may use it under WPB orders and regulations.

Regulation No. 13 governs only special sales and does not relate to sales in regular trade channels.

Priority Changes

Aluminum and chromium—Restrictions on the use of aluminum alloy steel and certain other materials from the order controlling the manufacture of safety equipment have been removed. M-1-i. (5-1-44)

Anti-friction bearings—The period for reviewing the requirements of substantial users of anti-friction bearings has been extended through January, 1945. Dir. 1 to Table 12 of M-293, as amended. (5-3-44)

Electronic components—A letter has been sent to all electronic prime contractors and test equipment manufacturers outlining restrictions covering the sale of electronic components under List B of Priorities Reg. 13. (5-3-44)

Electronic equipment—A person who gets materials with the priorities assistance given by Preference Rating Order P-43 may use the materials to make experimental electronic equipment for his own use. Int. 2 to L-265. (4-28-44)

Electronic equipment—The importance of keeping the expanded military electronics program at its highest production level throughout 1944 has been stressed. L-183-a. (5-1-44)

Farm machinery—Farm machinery production as a whole is running seriously behind schedule, approximately one-sixth. (5-1-44)

Filing requirements—Simplification of the mandatory filing requirements for certain war contractors and subcontractors subject to the Renegotiation Statute has been provided for. (4-29-44)

Fire equipment—Restrictions on the use of materials in the manufacture of fire protective, signal and alarm equipment have been eased. L-39, as amended. (5-1-44)

Floodlights—Distributors may acquire minimum inventories of floodlights. (5-3-44)

Industrial instruments—The use of chromium, nickel or any alloy of these materials in the manufacture of industrial instruments, control valves and regulators has been granted. L-134, revoked. (5-3-44)

Metallic hose and tubing—Special monthly reports on the production of flexible metallic hose and tubing have been called for by WPB. (5-3-44)

Oil drilling—Restrictions regulating the use of critical materials in oil well drilling operations in five counties of the Panhandle field of Texas were relaxed. Sup. No. 11 to Petroleum Administrative Order No. 11. (5-2-44)

Repair parts—Equipment service managers request continued planning for increased repair parts production. (5-3-44)

Sprocket chain—Certain provisions of the order relating to the working inventories of sprocket chain, attachment links or chain wheels that may be acquired by users or dealers have been clarified. L-193-a, as amended. (4-29-44)

Surplus products—Regular monthly revision of Priority Regulation 13 has been issued by WPB. (5-1-44)

Tractors—Applications must be filed in order to obtain wheel-type tractors and construction machinery attachments for other than farm use. L-257, as amended. (4-28-44)

Valves—There have been two changes in the definition of a "reconditioned valve" in the regulation governing pricing of reconditioned and used valves. Amdt. No. 128 to Rev. Sup. Reg. 14. (5-3-44)

Drop Forging OPA Industry Advisory Committee Formed

Washington

• • • Appointment of 13 representatives of firms engaged in the production of drop forgings to an industry advisory committee was announced by OPA. Members are:

A. D. Armitage, J. H. Williams and Co., Buffalo; V. F. Braun, Ladish Drop Forge Co., Cudahy, Wis.; J. M. Collins, Moore Drop Forging Co., Springfield, Mass.; J. F. Connelly, Champion Machine & Forging Co., Cleveland; W. E. Crocombe, American Forge Division of American Brake Shoe & Foundry Co., Chicago; W. J. Dean, Cape Ann Tool Co., Pigeon Cove, Mass.; W. A. DeRiddler, General Metals Corp., Los Angeles; E. Hodge, Jr., Pittsburgh Forgings Co., Pittsburgh; R. A. Kropp, Kropp Forge Co., Chicago; J. F. Rice, Drop Dies & Forgings Co., Cleveland; A. J. Sanford, Cleveland Hardware & Forging Co., Cleveland; C. H. Smith, Jr., Steel Improvement & Forge Co., Cleveland; and R. W. Stoddard, Wyman-Gordon Co., Worcester.

Steel Earnings at New Wartime Low Point

• • • With wartime production of the steel industry at record-breaking levels, wartime profits of the industry are far below those of many peacetime years, according to the American Iron and Steel Institute.

In 1943, net earnings dropped to a new wartime low, representing a return of only 5.1 per cent on investment and 2.8 per cent on volume of sales. This compared with 5.6 per cent on investment and 3.5 per cent on sales in 1942. (Ed. Note—These figures compare closely with those of the financial analysis made by this magazine, April 20, pages 120-121.)

After deduction of charges for payrolls, taxes and other expenses in 1943, a group of steel companies producing more than 90 per cent of the industry's total output showed an aggregate net income last year of \$200,754,000, including earnings of certain non-steelmaking subsidiaries of steel companies, such as shipyards, fabricating plants, railroads, etc.

The 1943 net income was thus about \$20,000,000 under that of the preceding year when the industry earned \$221,230,000.

By comparison, the steel industry earned a top peacetime total of \$455,000,000 in 1929, when production was 30 per cent less than in 1943. In 1929 the industry showed a return of 9.2 per cent on investment.

Preliminary reports of steel company earnings in the first quarter of 1944 show them to be at approximately the same level as in 1943.

In seven of the ten years of the 1920's the steel industry earned more than it did in 1943, despite the fact that at no time in that period did steel production amount to more than about 70 per cent of the tonnage which was produced in 1943.

Payrolls in 1943 stood at the record

level of \$2,653,505,000. This sum includes the payrolls of a number of steel company subsidiaries that do not produce steel.

The 1943 payroll was more than 20 per cent higher than in 1942 and was largely responsible for the reduction of net earnings last year. In 1942 payrolls amounted to \$2,176,051,000.

A total of \$617,119,000 was paid out in federal, state and local taxes by steel companies in 1943. That total was lower than the 1942 tax bill of \$776,104,000 largely because of the fact that substantial increases in payrolls and generally higher operating expenses resulted in a lower taxable income in 1943.

Dividends to stockholders dropped below the 1942 level. In 1943, the industry distributed \$148,749,000 in dividends as compared with \$152,716,000 for 1942.

Steel Earning Reported For the First Quarter

• • • American Rolling Mill Co., reported a first quarter net income \$1,229,035, which compares with \$1,535,205 earned during the same period of 1943.

Acme Steel Co., Chicago, had a first quarter net of \$420,987. During the initial quarter of 1943, net income reported totaled \$422,316.

Superior Steel Corp., Pittsburgh, reported a net profit of \$123,612 for the first quarter of 1944, which compares with \$151,015 for the corresponding quarter in 1943.

Keystone Steel & Wire Co., Peoria, Ill., reported earnings of \$269,600 for the quarter ending March 31, 1944, as against \$220,854 earned during the same period in 1943.

Midvale Co., Philadelphia, reported a net profit of \$2,035,111 for the 12

months ending March 31, 1944. Earnings during the preceding 12 months totalled \$3,730,218. Tax provisions and for renegotiation of contracts on the basis of renegotiation for 1942 were \$13,979,050. Another \$800,000 was reserved for contingencies.

Alan Wood Steel Co., Conshohocken, Pa., announced that first quarter earnings amounted to \$77,289, as compared with earnings of \$174,786 for the first quarter of 1943.

Republic Steel Corp., during the first quarter of 1944, earned \$2,216,611, after provisions of \$9,725,000 for federal income and excess profits taxes.

Colorado Fuel & Iron Corp., reported a net income for the first quarter of 1944 totalling \$663,224, as against \$416,388 earned during the first quarter of 1943.

Granite City Steel Co., during the first quarter of 1944, earned \$102,115, as against \$121,560 in the 1943 first quarter. Net sales were \$5,046,704 during the 1944 three-month period.

Crucible Steel Co., of America, netted \$1,279,302 for the first quarter of 1944, as against \$1,915,905 during the initial 1943 period.

Automotive Profit Margin Down 50 Per Cent from 1940

Detroit

• • • The profit margin of automotive companies on total sales has been cut in half in the past four years, according to George Romney, managing director of the Automotive Council for War Production.

The margin of profit on sales in the automotive industry has been steadily dropping, as follows:

Year	Net Profit, Per Cent
1940	8.3
1941	6.7
1942	5.2
1943	4.1

LOCOMOTIVE CAMOUFLAGE: On African and European battle fronts, these Whitcomb diesel electric locomotives, built by a subsidiary of the Baldwin Locomotive Works, Philadelphia are being used as all purpose locomotives and are designed for continental tunnel clearances. To protect them from enemy bombing planes, they are camouflaged as continental box cars, as shown in the photo on the left. Output of these units has been increased from 92 in March, 1943, to 130 in March, 1944.



Interest in Prefabricated Housing Firm Is Acquired by U. S. Steel Corp.

New York

• • • U. S. Steel Corp., last week completed negotiations to acquire a substantial interest in the Gunnison Housing Corp., New Albany, Ind. This will provide the company with research facilities and the experience of an established and leading organization serving prefabricated home buyers.

Foster Gunnison, founder and principal stockholder of the Gunnison Housing Corp., will continue in charge of the company's affairs. A pioneer in prefabrication, he has spent many years in perfecting the Gunnison home and before the war had set up a dealer organization that distributed Gunnison homes from coast to coast. The Gunnison design sells generally in the \$2800 to \$5000 price range.

In announcing the Gunnison deal, Benjamin F. Fairless, president of U. S. Steel, stated that "one of the best means of meeting the large postwar demand for homes for people of modest means will be through the application of mass production methods in the prefabricated housing field. To this end, U. S. Steel believes that steel will make an important contribution wherever it meets the requirements of design, utility and cost. Prefabricated homes should become one of the world's largest industries

and can substantially aid in postwar employment."

The prefabricated home is by no means a new development either with the U. S. Steel Corp., or in the steel industry in general. Early in the depression years, steel producers sought to enter the home construction mar-

Prefab Units Set for Wide Use in England

• • • Thousands of prefabricated homes will be built in England to house bombed-out families, according to plans which have reached an advanced stage. Three to five tons of steel may be required in each house, according to one report. Liberal use of aluminum will be made also, it is said.

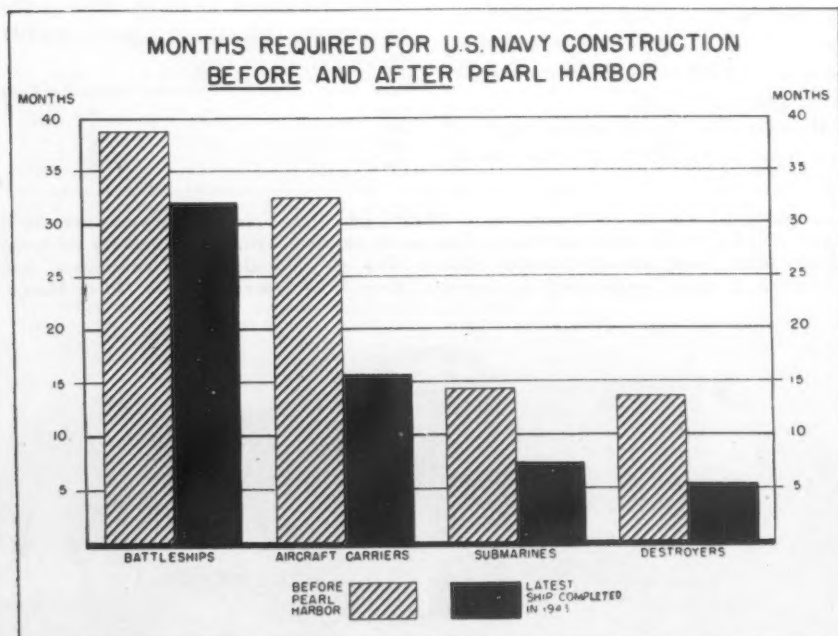
ket with varied ideas and designs. American Rolling Mill Co., cooperated with the Ferro Enamel Corp., of Cleveland, in the construction of a steel prefabricated home that featured porcelain enameled outside walls. These walls were in the form of sheets or units held together by stainless steel grooved strips. Also

interested in the development of porcelain enamel walled houses were such companies as Republic Steel Corp., Cleveland; The Austin Co., Cleveland; Porcelain Enameling & Mfg. Co., Baltimore; and Louisville Enameled Products Co., Louisville, Ky. Wheeling Steel Corp., likewise designed a steel house that incorporated steel in the wall studs, steel plate cores for floors, steel lathe for inside wall plaster, steel floor supports, and a formed steel wall support. This design could also use porcelain enameled outside walls. Great Lakes Steel Co., through its Stran-Steel Division, utilized cold rolled strip members for studs and joists. Bethlehem Steel Corp., and Jones & Laughlin Steel Corp., both experimented with steel framing, the latter marketing its patented lightweight channel and Junior I-beam sections. H. H. Robertson Co., of Pittsburgh, developed a structural member for housing that is a preformed structural strip section that is filled with cement.

Carnegie-Illinois Steel Corp., and Tennessee Coal, Iron & Railroad Co., both subsidiaries of the U. S. Steel Corp., have also done considerable development work in prefabricated housing. The southern subsidiary marketed a "Panelbilt" unit some years ago that was intended for distribution mainly in farming and rural areas. This was an all steel prefabricated unit, either farm house or farm buildings, with the outside walls of V-crimp, lightweight, galvanized, copper bearing sheet, welded to light cold rolled steel structural members. The outside panels were standard in size, and steel window sashes and door frames were prefabricated in their panels. The units had wood floors on steel joists, and wall board interiors.

Hobart Bros. Co., of Troy, Ohio, and Lincoln Electric Co., Cleveland, both have done some experimental work in all welded prefabricated houses.

The move is the second by the corporation in the past year toward protecting itself on potential postwar tonnage. The first move was in the barrel industry. Last October the name of the former Boyle Mfg. Co., sheet metal fabricating subsidiary of the corporation on the Pacific Coast was changed to United States Steel Products Co. and the new company purchased the Petroleum Iron Works Co. with plants near Sharon, Pa., and Beaumont and Port Arthur, Texas.



From Report of Admiral E. J. King

Speed Must Dominate in U. S. Termination, Reconversion, Says Johnston

• • • Eric A. Johnston, president of the Chamber of Commerce of United States, on May 1 told the House Committee on Postwar Economic Policy that speed and more speed must be used in the termination of war contracts and the reconversion of industries to civilian production.

He strongly emphasized the need for a favorable atmosphere for business, including decreased taxes, relaxed government controls and favorable legislation for postwar expansion.

He said, however, that elimination of priorities, allocations, rationing and price ceilings should wait until raw material and finished products approximate demand, and that even then their abandonment should be cautious but complete.

Mr. Johnston's 10-point program was as follows:

1. Establishment of government policies favorable to business.
2. Enactment of laws setting policy for reconversion.
3. Immediate legislation for prompt and equitable settlement of war contracts.
4. Early establishment of policies governing disposition of surplus war plants and supplies.
5. Maintenance of some war controls for a temporary period after the war to check inflationary tendencies and assure fair distribution of raw materials and consumer goods, but their elimination as soon as possible.
6. Modification of "oppressive" laws and administrative regulations to provide an adequate flow of investment capital to sustain an expanding economy.
7. Congress should encourage a return to state and local financing of public works and should take steps to strengthen the financial independence of states and communities.
8. Federal and state governments should correlate their expenditures for public improvements with private capital expenditures to insure the maximum practicable stability in construction work.

9. Business, through individual companies and activities of local, state and national organizations, "is doing its part" to promote postwar employment.

10. The special House committee on postwar economic policy "might" examine present laws and their administration to determine what factors are acting as a brake on job-creation in our war economy.

Among his specific proposals were: The creation of a demobilization agency to establish policies for disposition of surplus property and supervise demobilization of servicemen and war workers; the immediate organization of "settlement teams" of government negotiators to supervise the termination of war contracts; and the establishment of overall budget committees in both Houses.

Urging that the national economy be stabilized at the level reached when hostilities cease, Mr. Johnston said that to sustain a debt of almost \$300,000,000,000 plans should be keyed to an annual income of \$120,000,000,000 to \$140,000,000,000.

Profits May Be Cut, Navy Officer Warns

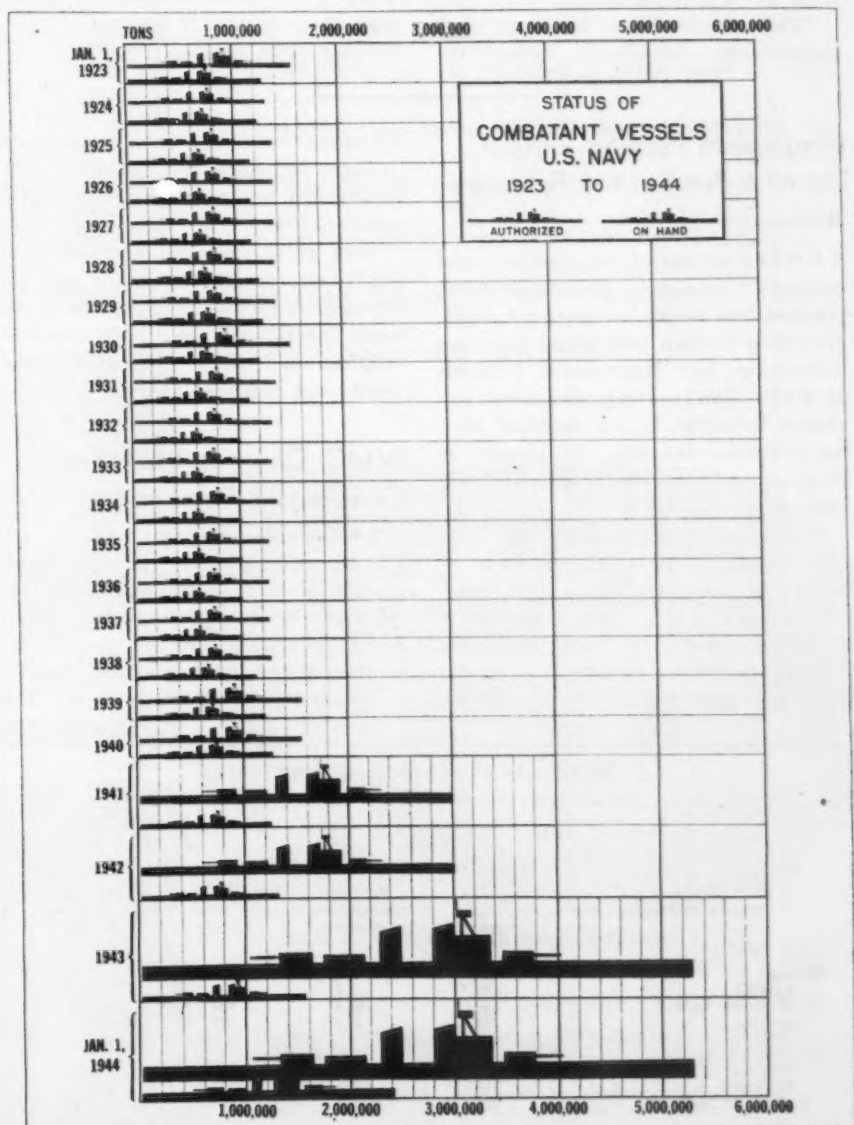
St. Louis

• • • War goods contractors will be subject to even greater scrutiny by renegotiation boards than prevailed during the past year according to Commander E. H. Wagner, Jr., member of the Navy Price Adjustment Board and assistant to the chairman of the New York division. Addressing the Midwestern Controller Conference of the Controllers Institute of America, Commander Wagner said on May 1:

"A review of the few 1943 cases that have been heard by the Navy Price Adjustment Board indicates that very few contractors have kept their renegotiable profits in line with adjusted 1942 earnings. Increased volume also has been observed in most instances. If these early returns are an indication of what the boards will encounter in reviewing 1943 cases, then contractors must expect lower allowable profit margins than in prior years. Low costs are of primary importance, and any pyramiding of costs resulting from high components must be stopped.

"Close pricing is a sub-part of the risk factor, so those contractors who are low-cost producers and have kept their prices down may expect favorable consideration.

"The results of renegotiation for the year 1942 will not be considered as precedents for 1943 determinations," Commander Wagner concluded.



From Report of Admiral E. J. King

Restrictions Imposed by Webb Act Outlined by Attorney General's Aide

• • • The Webb Act was intended to strengthen American competition against foreign cartels, but anyone under the impression it can be used as "an easy backdoor entrance for American firms to join forces with cartels seeking domination and control of world markets is in for sad disillusionment," Wendell Berge, United States assistant attorney general, told the Commerce and Industry Association of New York, May 1.

"The Webb Act," said Mr. Berge, "was exacted by Congress in the belief that it would provide a means of assistance to American business in combating the power of foreign cartels dominating world markets. The act was not passed to permit American firms to take part in cartel restrictions on American trade.

"You should have in mind that associations organized under the

Webb Act cannot legally enter into international agreements which restrict production and distribution, divide territories and so on.

"Neither can they enter into agreements which restrain trade within the United States, restrain the export trade of any domestic competitor or associations which enhance or depress prices or substantially lessen competition within the United States.

"It is clear that from the very beginning of the agitation for the act," said Mr. Berge, "it was understood that the activities of export associations would have to be strictly limited to the promotion of foreign export trade, and that any agreements or activities which restrain domestic competitors in either domestic or foreign commerce still would be illegal under the Sherman act."

Magnesium Forging Output Up 63.6 Per Cent in February

Washington

• • • The output of magnesium sand castings, forgings, and extrusions reached new peaks in February, 1944, according to data just released by the Aluminum and Magnesium Division of WPB. Sand castings shipments exceeded 6,600,000 lb., an increase of 6 per cent over January. Shipments of forgings rose to 54,000 lb., and extrusions to 168,000 lb.

Deliveries of permanent mold castings totaled 469,000 lb., a drop of about 12 per cent from the peak reached in January, 1944. Shipments of die castings in February were also smaller than in January, slackening by 7 per cent to 221,000 lb. Sheet

shipments recovered from the January decline, although the 194,000 lb. delivered did not reach the high of December, 1943.

This is the second in a series of WPB releases on magnesium cast and wrought products. The figures do not cover incendiary bomb body castings, magnesium sticks, extruded sheet stock, and extruded forging stock.

WMC Charges Manpower Chiseling in Pittsburgh

• • • Nonessential industries in the Pittsburgh area were accused recently of "chiseling" on the manpower rationing program of the WMC, which was inaugurated here two months ago to prevent the placing of this district in Group I labor shortage area. The

charges were made by Patrick T. Fagan, area WMC director, who said that the government agencies plan to crack down on employers and employees who disregard the employment regulations set up to provide as many workers as possible to war and war supporting industries which had been placed in groups 1 and 2. The latter groups, under the Pittsburgh manpower rationing plan, are allowed to hire employees on a basis of a certain percentage of their working force earlier this year.

In the case of companies engaged in distribution of food, it was said OPA will be asked to suspend their ration rise in case of violations of manpower regulations.

Manpower demand in the Pittsburgh district is expected to increase rather than decrease for the remainder of 1944, according to Lt. Col. Robert C. Downie, Pittsburgh district Army Ordnance chief.

"If a mandatory 48-hr. week for all industry is the only way we can solve this manpower problem, that's what I'll recommend," said P. T. Fagan, Area WMC Director. It is understood he will make a report in Philadelphia on May 10th. By that time efforts will be made to bolster up the Pittsburgh rationing plan for manpower, in order to prevent the district from being placed in Group I, which would have an adverse effect on new war contracts.

Aircraft Production During April Dropped Slightly

• • • Aircraft production during April dropped to 8343 craft of all types, according to Charles E. Wilson, chairman of the Aircraft Production Board. Fighter planes and bombers, however, represented an all time high of 77 per cent of the total, even though production fell by 774 planes from the March peak and 6 per cent in terms of airframe weight.

While the slump had been forecast, since greater emphasis is placed on urgently needed combat planes, it was conceded that actual production was even "slightly under" the schedule planned by APB on the basis of military needs. However, it was pointed out that needs of all services for tactical craft were fulfilled. Mr. Wilson traced the difference to a decision to "hold over" some unwanted planes, principally trainers.

Production of the new B-29, the superbomber, which is expected to play an important role in the final air attack against Germany, was described as "good."

Shipments of Magnesium Products

January and February, 1944. (Thousands of lb.)

Magnesium Products	January		February	
	Amount	Per Cent Change From December	Amount	Per Cent Change From January
Castings:				
Sand	6210	-0.2	6603	+6.3
Permanent mold	536	+40.3	469	-12.5
Die	238	0.0	221	-7.1
Wrought products:				
Forgings	33	-3.0	54	+63.6
Extrusions	110	-2.7	168	+52.7
Sheet, strip and plate	181	-18.5	194	+7.2

AMCO

Equipment **FOR**

HEATING · MELTING ANNEALING

AMCO Pit Furnace



AMCO Rotary Hearth Furnace



AMCO Open Hearth Furnace

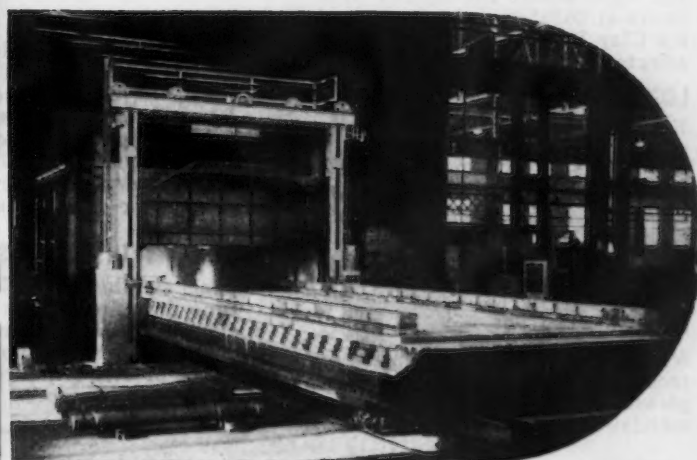


AMCO Heavy Duty Forging Furnace



AMCO is today playing a vital part in the nation's war-production program, resulting in a wealth of specialized experience that is at your command now or for post-war planning, to meet the widely varied problems of heating, melting and annealing.

AMCO Car Type Annealing Furnace



The **AMSLER - MORTON** *Company*
FULTON BUILDING · PITTSBURGH, PA.



SEMISILICA BRICKS

DURATION OF HEAT AFFECTS REFRACTORIES

Following statements are based on temperature range from 2200° F to 2700° F.

SHORT DURATIONS OF HEAT

Furnaces with daily or shorter firing cycles usually require a good clay or super duty brick.

MODERATE DURATIONS OF HEAT

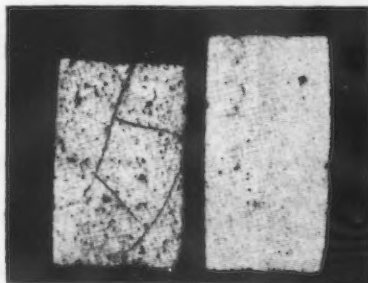
Furnaces with firing cycles of days, weeks or months require refractories which will not vitrify, shrink or spall, from the prolonged heats.

RM SEMISILICA BRICKS are made for this service. The picture at the right shows the results of 24 hours at 2650° F. on a First Quality Clay Brick and the almost unaffected RM.

LONG DURATIONS OF HEAT

Furnaces, intended to be run continuously can safely be lined with **RM SEMISILICA BRICKS**, provided the face temperature of the lining is below 2700° F. While silica bricks are ideal for continuous heats, a furnace may have to be shut down, which is hard on Silica Bricks, but **RM SEMISILICA BRICKS** take it easily.

Note. Some slags and gases attack refractories, so if in doubt, please ask or write for recommendation for your furnaces.



Compression, vitrification and spalling of First Quality Clay Brick, and relatively unaffected RM Semisilica brick after a run of 24 hours under heat and load.

In STEEL MILLS:

For Heating, Reheating, Annealing and Heat Treating Furnaces, OH Regenerators, Blast Furnace Stoves, Soaking Pits, etc. In the roofs, where spalling failure is most prevalent, they perform their greatest service.

In MANY INDUSTRIES:

Such as Chemical, Ceramic, Zinc Smelting and other industries where continuous heats in the temperature range of RM's are required for their processes.

RICHARD C. REMMEY SON CO.
PHILADELPHIA 37, PA.

REMMEY

250,000 Tons of Rails, Much Other Material, Required by Chile

Santiago, Chile

• • • The Chilean Government plans to spend 500,000,000 pesos—about \$15,000,000 at the current exchange rates—on railroad electrification during the next three years and almost two-thirds of that sum will be used for the purchase of materials and equipment in the United States. This announcement was made recently by Abraham Alcaino, Minister of Public Works and Communications.

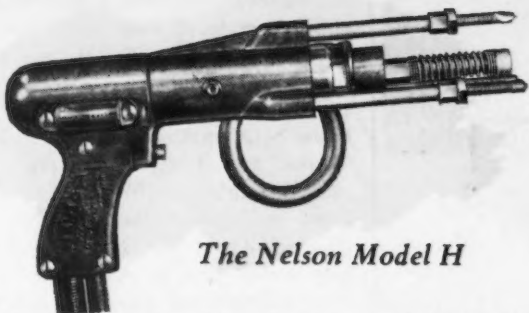
The cabinet minister added that other railroad activity planned for this country would include the purchase of rolling stock and equipment for the La Calera-La Serena and La Calera-Iquique lines, in northern Chile, and the line connecting Arica with La Paz, Bolivia, and preliminary surveys for a double-track subway for this city. Meanwhile, the Chilean State Railways announced that bids were being let for 250,000 tons of steel rails to be used in completing the Chilean section of the international railway between Antofagasta, Chile, and Salta, Argentina.

The electrification program would affect the Santiago-Tecla, Santiago-Cartagena and Paine-Talagante railroads. Alcaino went on to say that arrangements for financing the project have been completed and that the Chilean State Railways have been authorized to let bids in the United States for the purchase of nearly \$10,000,000 worth of electric locomotives, cables, cars, transformers and other machinery and equipment. The balance of funds assigned to the program will be used for construction in adapting present steam lines to electric service, reinforcing bridges, installing new signal systems and providing other necessary improvements.

Purchase of six new automotors, 1000 freight cars and other equipment for the La Calera-La Serena, La Calera-Iquique and Arica-La Paz railroads, already authorized, entails an additional expenditure of \$5,000,000, said Mr. Alcaino. Traffic on the international line between Arica and La Paz was interrupted recently by washouts which caused damages estimated at \$300,000, but the line is expected to resume normal operation within a few weeks.

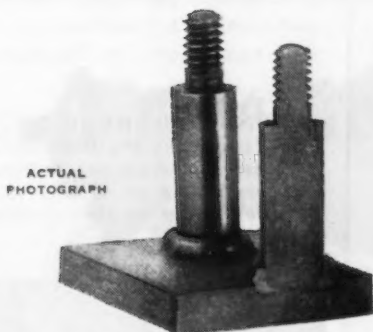
The 250,000 tons of rails to be acquired by the Chilean State Railways for completion of the Antofagasta-

How to save up to 75% of your stud welding time and material cost



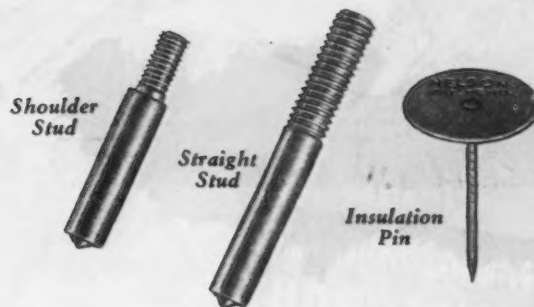
The Nelson Model H

Here's a stud welder—Light in weight, flexible in position, fully automatic in operation, are features *only* found in the Nelson Stud Welder. With it welds are made in *less than one-half second*. The stud is put in the chuck end of the unit and placed in contact with the steel plate . . . by pulling the trigger the gun automatically welds.



ACTUAL
PHOTOGRAPH

Here's a stud weld—The weld is stronger than the stud. Complete fusion of the stud to metal results from a fully shielded arc. The stud is placed in the gun, contacted to the metal, and the operator pulls the trigger. This causes the current to retract the stud establishing an arc from the stud to the plate. Zip! And the gun plunges the stud into a molten pool of metal completing the weld. *There's no hole made to weaken the metal parts!*



Here are studs—They're made in several sizes and styles for various uses. The Nelson studs are patented "flux-filled" all-position welding studs. They are available in diameters of $\frac{1}{4}$ " to $\frac{1}{2}$ "—in overall lengths of 1" to 8". Insulation of all types may be secured with the patented Nelson Insulation Pin.



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Securing hangers for wireways • Manufacturing of waterproof boxes • Securing all types of insulation • Insulating freight and refrigerator cars • Installing portable steel scaffolds • Prefabricating buildings • Locomotive installations • Boiler insulation • Securing wood decking • Manufacturing trucks and trailers • Securing parts to steel castings of all kinds, and numerous other uses.
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NELSON STUD WELDERS & STUDS

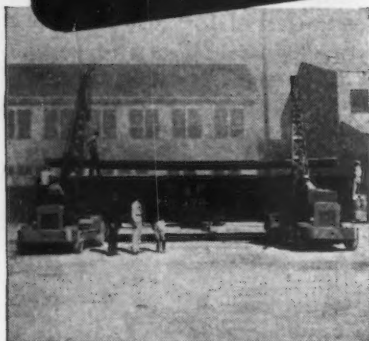




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• Roustabout Crane hustles gasoline drums at an airport.

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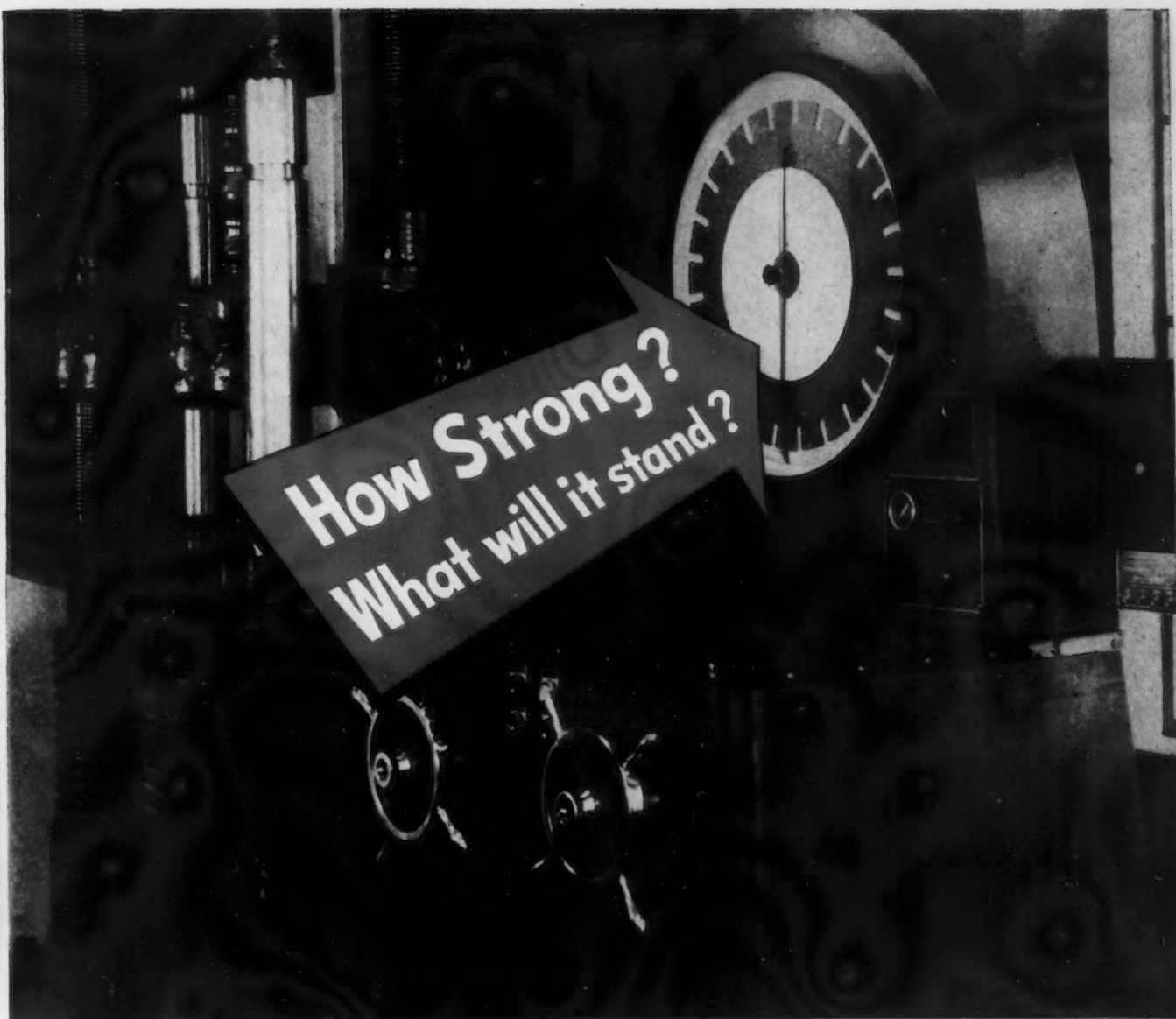
Salta railroad between this country and Argentina will be laid on a 22-mile stretch of completed roadbed between Punta de Rieles and Monturiqui, and on a 14-mile section of roadbed now awaiting construction westward from Socompa, frontier terminus of the Argentine division of the international railroad. Utilization of existing lines from Antofagasta, when construction on the Chilean section of the road was begun, made it possible for Chile to limit its share of construction to 110 miles, and the line is now complete from Antofagasta to Punta de Rieles. Costs of manufacturing and laying rails on the uncompleted sections of track are estimated at 41,000,000 pesos, approximately \$1,230,000.

The proposed subway for Santiago, to be built by the Ministry of Public Works and Communications, would run through the heart of the city from the Mapoch Railroad Station to the vicinity of the Barros Luco Hospital, according to Alcaino. Cost of the underground has been estimated at about 200,000,000 pesos, roughly equivalent to \$6,000,000 in United States money, and the Public Works Minister added that financing of the project had been arranged with large investments from abroad. According to present plans, the subway would go into partial operation in 1946.

Other public works announced by Alcaino are aimed at alleviating unemployment in northern Chile caused by reduced copper and nitrate mining operations. They include a 12,000,000-peso waterworks in Tocopilla.

"ROBIN HOOD" WEAPON: *The cross bow is serving Westinghouse research engineers to draw out delicate quartz filaments used to measure the magnification power of the electron microscope.*





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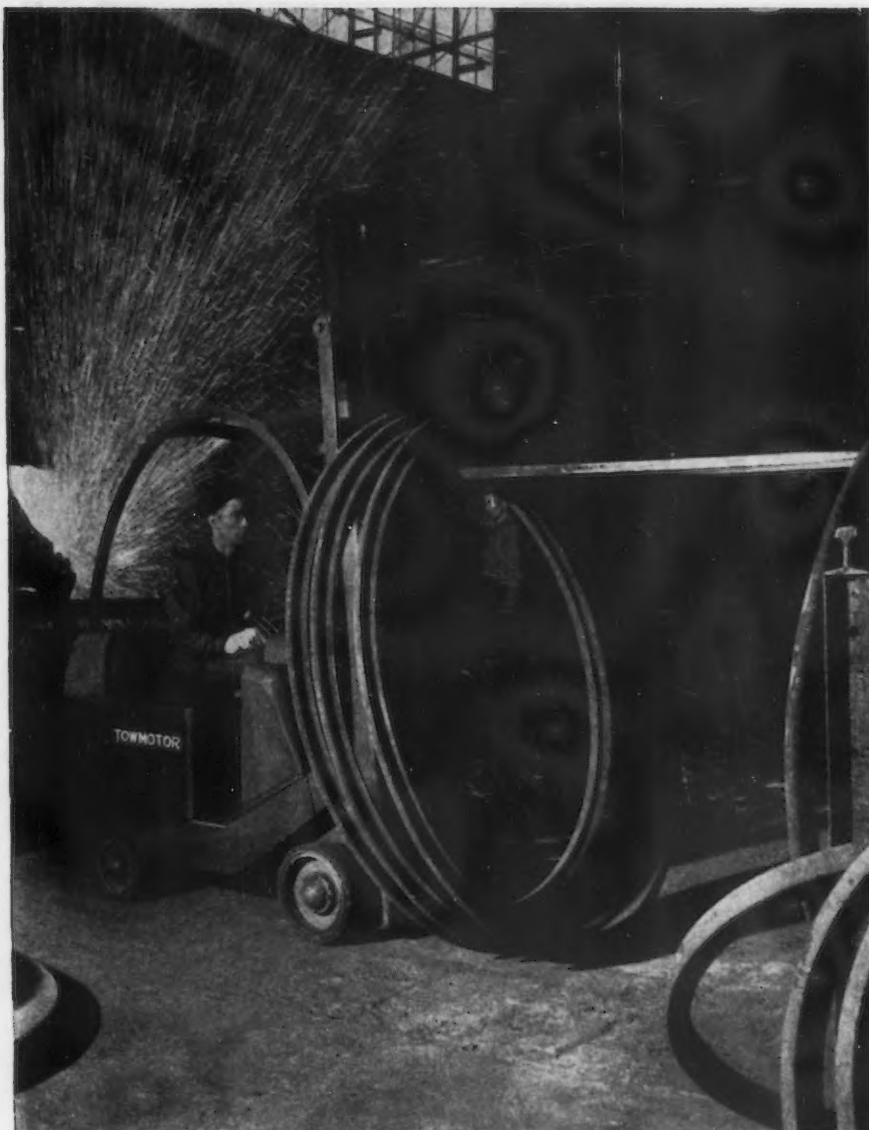


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STRAIGHT-GAS POWERED INDUSTRIAL TRUCKS EXCLUSIVELY—SINCE 1919

126—THE IRON AGE, May 11, 1944

NEWS OF INDUSTRY

Steel Co. of Canada Plans Expansion

Toronto

• • • The Steel Co. of Canada, Ltd., in the first three months of this year showed a 7 per cent gain in steel ingot production over the corresponding quarter of 1943, Ross H. McMaster, president stated. Consumption of purchased steel, however, was lower in the period. Mr. McMaster stated that sales for March were the highest ever attained in a single month, while those for the quarter compared favorably with the record quarterly figures in recent years. Irrespective of the extremely high rate of operations, resulting net profit is restricted to 70 per cent of the "standard" prewar figures now permitted, the president stated.

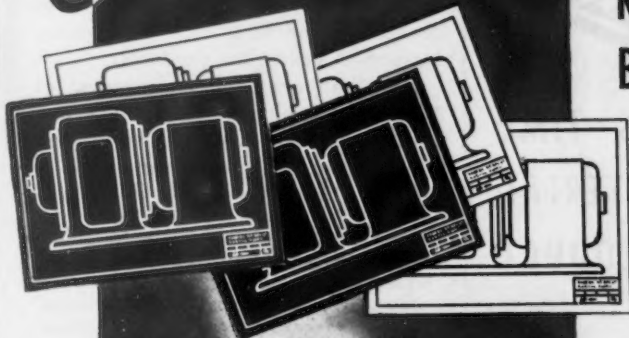
Shortage of manpower still persists and labor turnover has retarded production at some finishing plants. Employees of the company now include 1200 women, many doing work formerly performed by men. Steel production for the first four years of the present war was 272 per cent greater than in the four years of World War I. For the second year in succession a new record ingot production has been established by the company, which was in large part due to enlarged production facilities.

"In the postwar period the company plans to increase finishing capacity," Mr. McMasters said. "Under existing conditions the estimated cost of proposed expansion work, based largely on firm tenders, is from 50 to 60 per cent above prewar levels. Notwithstanding the company's anxiety to make the utmost contribution to the expansion of employment after the war, the effect of existing taxes upon cost of new construction makes it difficult to reach a decision until the policies of the government are made known.

Such extensive and specialized installations as are contemplated involve important expenditures that must be made outside of Canada for machinery and parts only obtainable in the United States. On these imports there is levied a sales tax of 8 per cent, a war exchange tax of 10 per cent, customs duty of 10 per cent (the rate applying to machinery of a class or kind not made in Canada), all of which combined with the premium on United States funds, increase the cost of expenditure by almost 43 per cent, a big handicap in favor of American competitors.

Versatility

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BLUEPRINTS with sharp white lines and dark blue backgrounds . . . also Blueline prints with clear cut dark blue lines on clean white backgrounds are made better and faster, 30 feet per minute with Pease "22" (not shown). What is more, they are made at lower cost . . . as low as one cent (and even less) per square foot of finished prints on Pease Continuous Blueprinting and Processing Machines.

BROWNPRINTS (Negatives) and Brownline prints instead of Blueprints are made on Pease Continuous Blueprinting-Processing Machines by simply using Negative Paper and utilizing the quick change Chemical Applicator System to change from Potash to Hypo. Pease Machines are the only ones, to our knowledge, wherein Hypo is applied to both sides of the paper thus producing superior color. The prints are then dried in the continuous drier.

WHITEPRINTS (Dry Direct Process) are efficiently made by exposing Pease Multazo Whiteprint paper, or any other Dry Direct Process paper, in any Pease Printer, after which exposure the prints are developed in a separate, table style, Pease "700" Continuous Multazo Whiteprint (Dry Direct Process) Developing Machine (illustrated at left).

WET DIRECT PROCESS PRINTS are made by threading the Wet Direct Process paper through the Printer and the Pease "K" Continuous Wet Direct Process Developing Attachment (illustrated at left), which is firmly bolted to the printer and which consists of a developer tank, tray and rolls. The prints are then carried over the drier, through the wind up device which delivers them at the back of the machine.

PEASE FEATURES . . . Sliding "Vacuum-like" Contact smooths tracings, prevents errors in printing • Three Speed Lamp Control provides operation at 10, 15, or 20 amperes, minimizes running speed and drier heat changes • Actinic "No-Break" Arc Lamps burn 45 minutes without breaking arc, resume instantaneously • Horizontal "Floating" Water Wash floats prints free from tension, prevents wrinkles, stains, bleeding • Quick Change Chemical Applicator System economically allows change from Blueprints to Negatives in 30 seconds • Eight-Inch Diameter Drying Drums, thermostatically controlled, heated by gas or electricity, dry prints "flat as hanging wallpaper."

PEASE SENSITIZED PAPERS are completely dependable for superior Blueprints, Blueline Prints, Brownprints (Negatives), Brownline Prints and Multazo Whiteprints (Dry Direct Process). Of course, Papers produced by other manufacturers may also be used satisfactorily.

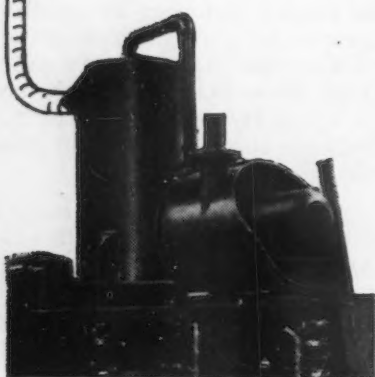
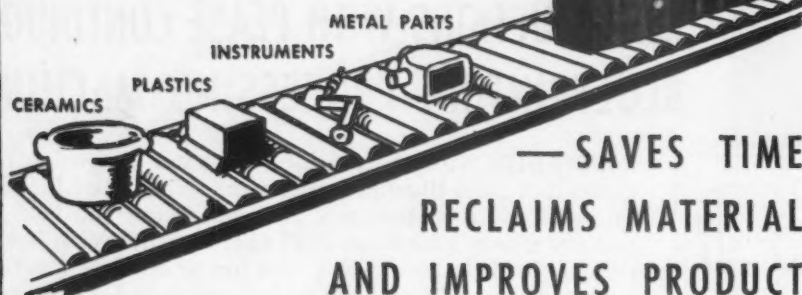
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Pease "22-16" Continuous Blueprinting and Processing Machine has an actual production speed of 20 feet per minute. Pease "22" (not illustrated) has a speed of 30 feet per minute.

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The same machine can also clean finished products ranging from watches and communication equipment to ships, planes and tanks.

Spencer vacuum, piped direct to the production line, benches or assembly tables is removing metal chips, lint, dusts and liquids without holding up the work.

One Spencer vacuum producer like that shown at the left will supply suction at a

dozen points where products should be cleaned. Also furnish vacuum to a crew of operators for cleaning of floors, ceilings and walls.

Rated as essential by hundreds of war-time production plants, it will be a necessity for competitive manufacture of peace-time products wherever speed, accuracy and overall efficiency are involved. Ask for the bulletins.

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Postwar Employment Hinges on Capital

Washington

• • • Frederick C. Crawford, chairman of the board of the National Association of Manufacturers, warned Congress that the number of postwar jobs and the degree of postwar prosperity were geared directly to the speed and realism shown by government in shifting the American war production machine back into manufacture of peacetime products.

Mr. Crawford, who is president of Thompson Products, Inc., Cleveland, testified before Representative Colmer's Special House Committee on Postwar Economic Policy and Plan-

NAVY PONTOONS: *The use of the Navy pontoons has made possible many of the sensational successful landing operations. The LST borne pontoon causeway went into use in the Marshall Islands invasion. With four sections of the causeway joined together, the heavy invasion equipment moves ashore rapidly.*

(U. S. Navy Photo)



pital

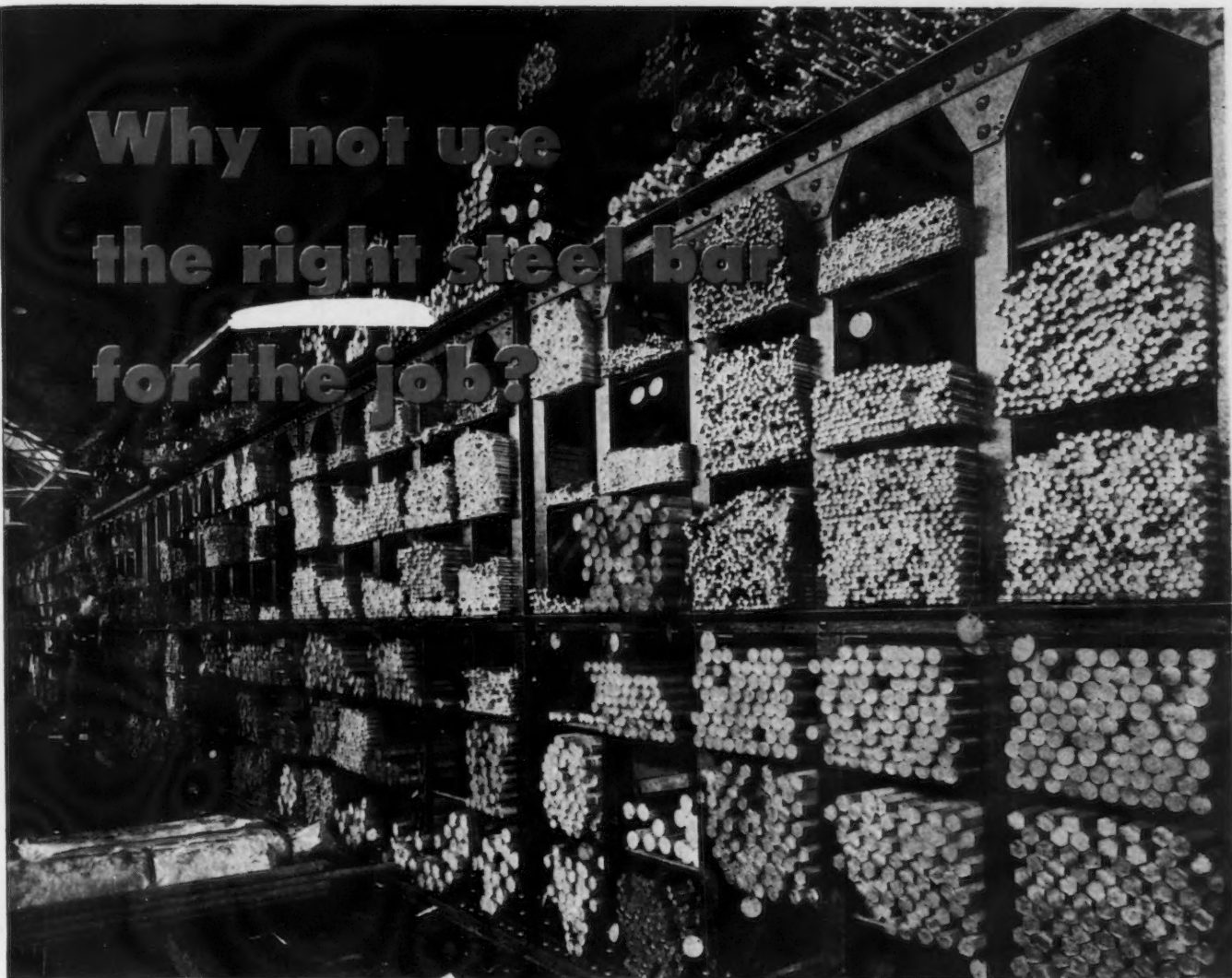
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(Photo)

Why not use the right steel bar for the job?



JUST ONE OF THE BAR RACKS IN ONE OF JORGENSEN'S WAREHOUSES

Many such racks are required to hold the thousands of different items that comprise Jorgensen's bar stocks—one of the most complete in the steel warehousing industry—consisting of carbon, alloy and stainless steels in a wide assortment of analyses, conditions, shapes, finishes, etc.

For example—take just one diameter and one shape—say a 1" round.

Jorgensen's stocks include **forty different kinds** of 1" round bars!

And that's just **one diameter**—Jorgensen's stocks include **dozens** of diameters, ranging from 1/16"

wirelike bars, weighing a fraction of an ounce per foot, to huge 16" diameter forged (pressed) bars, weighing over seven hundred pounds per foot. And that's only the **round bars**—stocks also include hexagons, octagons, squares and flats in thousands—but that's a long story!

The point is, Jorgensen's stocks are not limited to the fast-moving items—Jorgensen can supply the **right bar** for your particular application. For steel bars, as for other steel products, you'll find it to your advantage to **CALL JORGENSEN FIRST!**

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Model 11020-A

Internal discharge type. Outside piping eliminated. From 1/10 to 3/4 h.p.

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The "Gusher"—A Modern Pump for Modern Machine Tools.

NEWS OF INDUSTRY

ning. He did not offer a prepared statement to the committee. Speaking from notes, he used his own business to illustrate specific transition problems: The imperative need for working capital, termination of contracts, reconversion, disposal of government plants and surplus stocks.

"More employers require more capital. If we want 25 per cent more employment, we must have 25 per cent more capital. Remember, it takes around \$6000 of invested capital for manufacturing industry to employ every single worker."

Industry's working capital is tied up in the war today, in actual inventory or production facilities, Mr. Crawford said. While renegotiation and taxation were not subject to discussion before the committee, Mr. Crawford pointed out that they vitally affect capital, reconversion of industry and postwar jobs. Unless it is possible to get working capital out of the war speedily and without any strings attached, postwar employment is bound to lag accordingly.

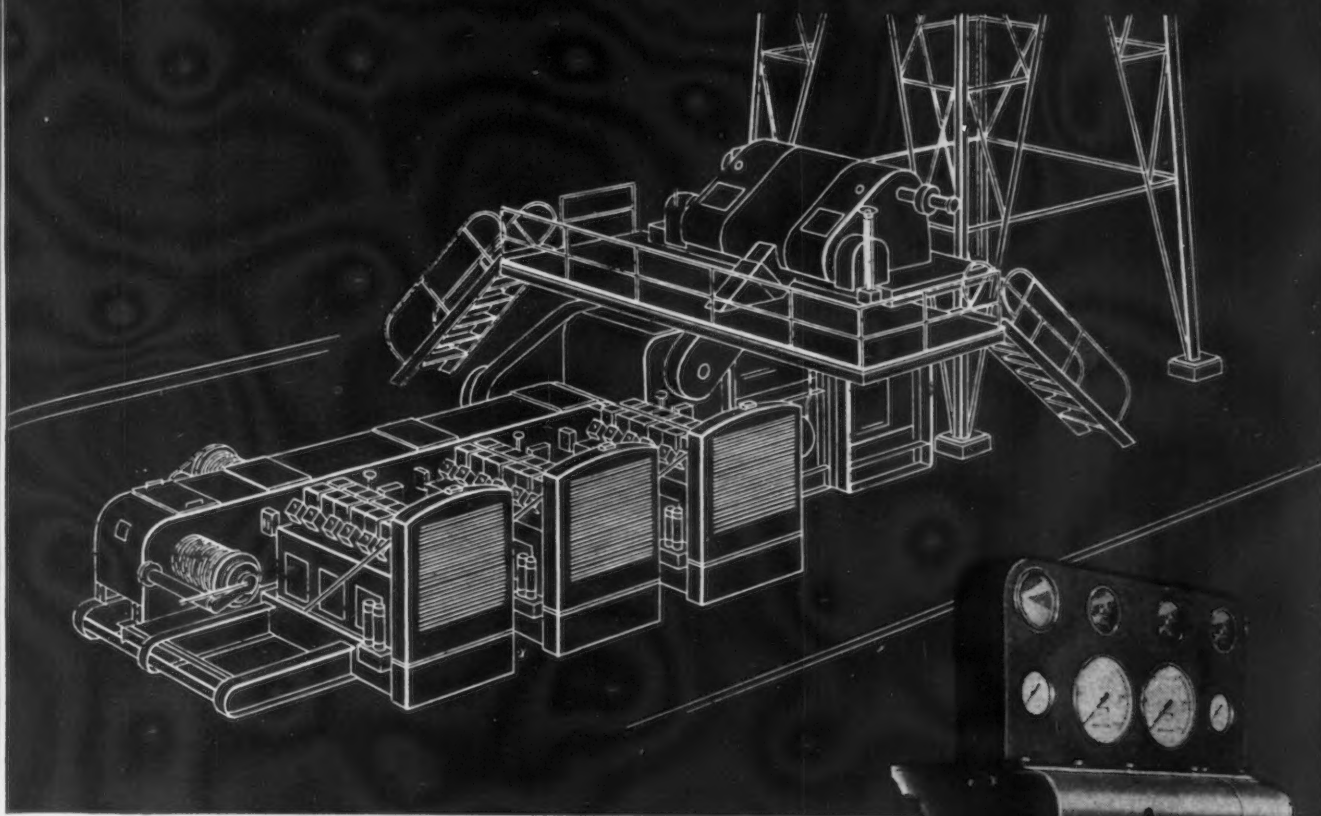
"Capital, and I mean sufficient capital," said Mr. Crawford, "is the answer to 90 per cent of our transition and postwar problems. Whether it goes into existing businesses or into new businesses, this increased capital is the first requisite in adding the needed extra postwar jobs to the payroll."

As capital represents 90 per cent of industry's postwar problems, the committee's job will be 90 per cent completed when it writes legislation for releasing industry's funds and productive facilities from the war as speedily and as completely as full prosecution of the war permits, Mr. Crawford stated.

200,000 Tons of Materials Put to Use by Oil Industry

••• More than \$16,000,000 worth of idle and surplus materials has been put into productive use in the petroleum industry in nine months as a result of action taken under the Petroleum Administration for War's Materials Redistribution Program No. 2, says Administrator Harold L. Ickes. The 200,000 tons of idle and surplus materials put into productive service included more than 100,000 tons of oil country tubular goods; 2,000,000 ft. of sucker rods; 5000 compressors, electric motors, prime movers, and pumps; 7000 valves; 4000 steel tanks; and hundreds of heat exchangers, towers, and pressure vessels.

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W·A·B Controls permit all of these complex functions to be governed from one compact control stand. A finger touch is all that is necessary to initiate and command the most powerful operating forces. The entire cycle of operation of individual engines can be covered by positioning the handles, and in compound operation loads can be readily balanced. Simple and positive interlocks prevent the setting up of opposing actions, and the sensitive re-

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R-S pioneered in the development of Salt Bath Furnaces for the solution heat-

treatment of aluminum alloys. They produce uniform physical properties and high capacity in minimum floor space. The R-S Convection Type Furnace is recommended for conditions where the Salt Bath is not applicable.

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NEWS OF INDUSTRY

Seized Enemy Metal Turning Patents Listed

• • • This is the 26th list of seized enemy patents, available on license from the Alien Property Custodian. These patents are grouped in classes. Sub-class numbers are shown first in parentheses, followed by the patent number, description of the patent, the inventor's name and nationality, and the date of issuance.

This series began in the Nov. 4 issue of THE IRON AGE, page 95, at which time procedures for obtaining the patents for use were described with information concerning their usage and possibilities. Seized patent applications were shown in THE IRON AGE on July 8.

Class 82—Turning Lathes

- (1) 1,625,650. Method of machining double conical workpieces on lathes in a continuous procedure and without rechucking. K. Gottmanns, Germany. 4-19-27.
- (1) 1,814,211. Tool holder for boring blanks or for cutting screw threads into these borings. J. Garbarek, Germany. 7-14-31.
- (1) 1,821,743. Method and device for turning out the rings of roller bearings and similar grooved rings. R. Dreyhaupt, Germany. 9-1-31.
- (1) 2,293,175. Apparatus for determining the magnitude of at least one of a number of variable factors in the removal of cuttings by machine tools. H. Ruhl and R. Germar, Germany. 8-18-42.
- (2) 1,859,715. Arrangement on lathes and other machine tools with drive by hydraulic stepless gearings. M. Ritter, Germany. 5-24-32.
- (2) 1,950,332. Hydraulic actuating means for lathe slides. F. von Pechmann, Germany. 3-6-34.
- (2) 1,957,667. Chip flow lathe for hard-metal and diamond tools. M. Ritter, W. Mobius, O. Rotherberg and F. Block, Germany. 5-8-34.
- (2) 2,209,037. Device for control of the cutting speed of machine tools. P. Riegger, Germany. 7-23-40.
- (2) 2,219,845. Guiding of blanks fixed at both ends in machine tools. E. Meier, Germany. 10-29-40.
- (5) 1,775,737. Screw cutting lathe and like turning engine. O. Schaerer, Germany. 9-16-30.
- (5) 1,942,403. Feeding device for a special lathe. H. Arni, Germany. 1-9-34.
- (5) 1,945,586. Manufacturing goffering cylinders for engraving lenticular elements on films. H. Arni, Germany. 2-6-34.
- (5) 2,204,441. Thread cutting device for lathes. W. Ogilvie, England. 6-11-40.
- (8) 1,720,227. Wheel lathe for machining locomotive wheels. K. Lurf, Germany. 7-0-29.
- (8) 1,733,892. Clamping means for wheel lathes in which both the axial clamping as well as the centering of the axle in its axle journals is positively effected without the requirements of any fixed abutment. K. Lurf, Germany. 10-29-29.
- (8) 1,736,694. Stop for locating work in machine tools. E. Blau, Germany. 11-19-29.
- (9) 1,676,175. Centering device for use in machining crank shafts, eccentrics, or the like. J. Benz, Germany. 7-3-28.
- (9) 1,713,892. Tool moving device for crank lathes. A. Dorin, Germany. 5-21-29.
- (14) 1,739,268. Device for copying on machine tools. F. Stein, Germany. 12-10-29.
- (18) 2,109,454. Apparatus for cutting grooved rolls. H. Becker, Germany. 3-1-38.
- (20) 1,767,224. Automatic lathe having a fixed face plate as a carrier for the work and a moving control ring for the tools. F. Mulka, Germany. 6-24-30.
- (20) 1,830,881. Attachment for turning work pieces by means of broad cutters. F. Mulka, Germany. 11-10-31.
- (24) 1,778,494. Universal attachment for lathes. A. Gronwald, Germany. 10-14-30.
- (25) 2,144,955. Lathe comprising a main carriage, a work spindle, means for holding a plurality of tools to operate on the lower quarter of the work in the sector formed by angles of 45 deg. before and behind a vertical plane passing through the axis of the work. L. Antonelli, Italy. 1-24-39.
- (27) 1,706,763. Feed screw mechanism for lathes. J. Wilberz, Germany. 3-26-29.
- (29) 2,271,598. Machine tool with special

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How Follansbee flexibility

can save you time

Prompt answers to your inquiries save you time and money, make your job easier. The ability to adjust production schedules frequently in order to give you the service you want is but another of the many advantages offered by Follansbee.

A manufacturer of tanks was in need of 1,000 tons of alloy steel within 21 days. A telephone conversation with the Follansbee general offices brought him a

favorable answer *within the hour*—and delivery was subsequently made as scheduled. Production schedules cannot always be adjusted to accommodate such orders, of course—but a prompt answer can always be depended upon.

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Does your Absenteeism Rise with the Thermometer?

You can hold it down at a cost of less than 1 cent a man per week

A rising temperature and a rising number of absentees usually go together. One reason is sweat.

Sweat robs the body of essential salt. This loss of salt dehydrates the body. It thickens the blood. Throws body fluids out of equilibrium. The result is Heat-Fag. Workers are tired, easily fatigued. They lack the "drive" that keeps production soaring.

Water alone can't replace the fluids lost through sweat. Water alone in hot, sweaty conditions dilutes body fluids and causes heat cramps.

The real answer is water and salt tablets at every drinking fountain. Then workers who do hard work and sweat can take a Morton's Salt Tablet every time they take a drink of water. This is the easy, simple, sanitary way to maintain the proper salt balance. It is recommended by industrial physicians and endorsed by America's greatest corporations. The cost is less than 1 cent a man per week.



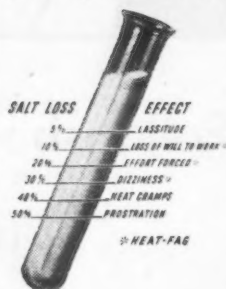
MORTON'S DISPENSERS

They deliver salt tablets, one at a time, quickly, cleanly—no waste. Sanitary, easily filled, durable. 800 Tablet size - - - \$3.25

Order from your distributor or directly from this advertisement... Write for free folder.

MORTON SALT COMPANY, Chicago 4, Ill.

This Is What Happens When Sweating Robs the Body of Salt...



QUICK DISSOLVING (Less than 30 Seconds)

This is how a Morton's Salt Tablet looks when magnified. See how soft and porous it is inside. When swallowed with a drink of water, it dissolves in less than 30 seconds.

Case of 9000, 10-grain salt tablets - - - \$2.60
Salt-Dextrose tablets, case of 9000 - - - \$3.15



reference to a lathe or the like. A. Maurer, Germany. 2-3-42.

(31) 1,921,502. Puppet head especially suited for lathes designed to work large and heavy works. K. Brill, Germany. 8-8-33.

(32) 1,763,519. Lathe with capstan and cross-slide rests. W. Heinemann, Germany. 6-10-30.

(33) 2,235,079. Turning lathes particularly with reference to turning lathe beds of the type comprising a tubular bed body. W. Mobius, Germany. 3-18-41.

(34) 2,193,042. Tool centers and like members of machine tools, with particular reference to rotating lathe centers adapted to take up and equalize longitudinal expansion in the workpiece caused by heating. W. Roterberg, Germany. 3-12-40.

(35) 1,716,762. Adjustable setting up piece for tools and work pieces. B. Buxbaum, Germany. 6-11-29.

(36) 1,891,290. Work piece guide for machine tools. K. Tessky, Germany. 12-20-32.

(37) 1,935,999. Bar guide for machine tools. K. Tessky, Germany. 11-21-33.

(38) 2,002,282. Work piece guide for machine tools. K. Tessky, Germany. 5-21-35.

(39) 1,725,330. Surface plate for wheel lathes of the type in which jaws are provided for engaging the tire or the rim of the wheels on the inside instead of drivers engaging between the spokes, or inserted in holes, of the wheel center. E. Blau, Germany. 8-20-29.

(40) 1,962,794. Process and apparatus for making aerial propellers. T. von Karman, Germany. 6-12-34.

(41) 2,067,618. Device for automatically equalizing the tightening pressure in semi-automatic gripping devices, chucks and the like. A. Pachta, Germany. 1-12-37.

(42) 2,293,175. Indicating apparatus for use with machine tools. H. Ruhl and R. Germar, Germany. 8-18-42.

(43) 1,822,805. Automatic lathe. A. D'Hallo, France. 9-8-31.

(44) 1,836,648. Device for automatically con-

GUN MOUNT "DRAG": To make certain that Navy 20 mm. anti-aircraft gun mounts revolve with a minimum of "drag," each one gets a thorough test at the Center Line Ordnance plant in Detroit, which is operated by Westinghouse. Here, an inspector measures with a hand scale the amount of "pull" necessary to swing the movable part of the mount.



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Bottleneck Breakers

By pressing metal powders into the desired shape in one stroke, it has been possible for Chrysler Corporation to produce many parts for weapons in but a fraction of the time required to machine them by ordinary methods. This process also eliminates waste of precious materials and saves countless man-hours.

It all started some years before the war when Chrysler Corporation's Amplex Division began pressing "Oilite" bearings out of powdered metal and impregnating them with oil which penetrated the tiny pores of the metal itself. Once installed in hard-to-reach places in automobiles, vacuum cleaners,

washing machines and other devices, these bearings provided their own lubrication without further attention.

Today almost every American-built weapon is made in larger quantity, at a saving of time and material, and functions better in action because it contains from one to scores of precision parts made by Powder Metallurgy. Such parts range from single pieces weighing 64 pounds down to tiny rivets weighing 10,000 to a pound.

Thus the science of peace has been applied to conserving the nation's manpower, materials and finances while speeding the production of better weapons.



You recall how Grandma mixed flour, seasoning and baking powder . . . then shaped and baked them into vastly different kinds of cookies, doughnuts, cakes and bread.

Powder Metallurgy is fundamentally very similar. Starting with metal "flour" so light and fluffy a breath of air would blow it away, various "recipes" are mixed, pressed in molds and actually "baked" in huge heat-treating ovens . . . to become tough, finished parts for many types of war equipment.

LET'S ALL BACK THE ATTACK—BUY MORE WAR BONDS

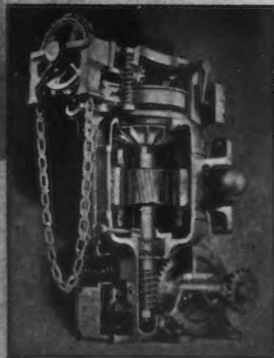
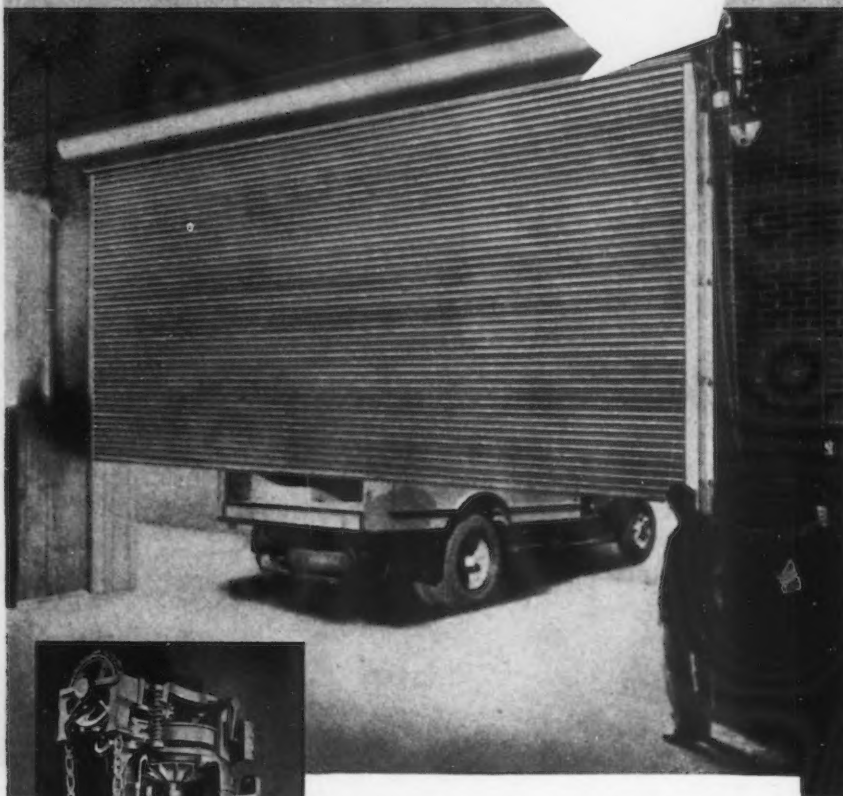
Chrysler Corporation

PLYMOUTH • DODGE • DE SOTO • CHRYSLER

AIRTEMP Heating, Cooling, Refrigeration CHRYSLER Marine and Industrial Engines OILITE Powdered Metal Products

You'll Enjoy Major Bowes and His Amateurs
Thursdays, 9 P. M., E. W. T., CBS Network

Let this "robot" open and close your doors



Sectional view of the Kinnear Motor Operator, showing sturdy, integral construction.

Turn your door-tending over to the Kinnear Motor Operator! It will enable you to raise and lower doors by merely touching a button. You'll speed up door traffic and save time and labor. You'll also save on heating and air-conditioning costs because doors won't be left open through neglect. Look at some of the construction features of the rugged Kinnear Motor Operator: machine-cut gears of chilled

nickel bronze, worms of nickel steel, bronze and graphite oilless bearings—proof that it's engineered for long, faithful service! And every Kinnear Motor Operator is matched to the load requirements of the particular door with which it is to be used. Write for details today. And if you're not already obtaining all the special advantages of Kinnear Rolling Doors, you'll want information on them too, The Kinnear Mfg. Co., 1760-80 Fields Ave., Columbus 16, Ohio.

Offices and Agents in All Principal Cities

KINNEAR

ROLLING DOORS

trolling the slide rests of lathes and machine tools. G. Cuttat, France. 12-15-31.

(2) 2,154,326. Machine tool for turning or rotary machining of work of non-circular cross-section, such as ingots and cast blocks, for example, of pyramidal shape and square section. A. Dorin, Czechoslovakia. 4-11-39.

(4) 1,833,589. Turning device for turning off shafts, crank shafts, and other machine parts on the spot. P. Polderman, Netherlands. 11-24-31.

(5) 1,735,666. Micrometric screw cutting machine. M. Audibert, France. 11-12-29.

(5) 2,265,265. Threads cutting machine which operates as a horizontal lathe but in which the piece to be threaded is always revolving in the same direction. X. Castelli, France. 12-9-41.

(11) 2,305,756. Stepped profile turning whereby work pieces having different diameters for different lengths may be produced without any possibility of erroneous execution. L. Padova, Italy. 12-22-42.

(13) 1,755,860. Shaping machine of the type in which a profiled tool is rolled in a direction parallel to the work axis to generate a corresponding profile on a rotating working-piece. A. Barba, France. 4-22-30.

(14) 1,976,459. Process for rough turning in the lathe or similar machine tool. P. Quichon, France. 10-9-34.

(14) 2,036,436. Device for rough turning in the lathe or similar machine tool. P. Quichon, France. 4-7-36.

(18) 1,755,349. Lathe mechanism for oval turnings which may be embodied in machines for different industries and in particular for hat manufacture. M. Casse, France. 4-22-30.

(18) 1,894,899. Method and apparatus for machining rolls such as pilger rolls and the like. H. Tachochner, Czechoslovakia. 1-17-33.

(18) 1,904,802. Apparatus for machining rolls for rolling mills and the like. H. Schimmel, Czechoslovakia. 4-18-33.

(18) 1,909,225. Apparatus for machining rolls for rolling mills. H. Schimmel, Czechoslovakia. 5-16-33.

(18) 1,909,226. Method of and apparatus for machining rolls for rolling mills. H. Schimmel, Czechoslovakia. 5-16-33.

(18) 1,910,308. Apparatus for machining rolls for rolling mills and the like. H. Schimmel, Czechoslovakia. 5-23-33.

(18) 1,918,138. Apparatus for machining rolls for rolling mills and the like. H. Schimmel, Czechoslovakia. 7-11-33.

(18) 1,918,139. Method and apparatus for machining rolls for rolling mills. H. Schimmel, Czechoslovakia. 7-11-33.

(18) 2,189,868. Apparatus for forming external threads in a workpiece. G. Hagerman, Dayton, Ohio, assignor, by mesne assignments, to Societe d'Exploitation des Brevets Moineau, Luxembourg. 2-13-40.

(21) 2,173,009. Electromechanical control device for lathes and other machine tools. J. Cotal, France. 9-12-39.

(21) 2,297,501. Feed interruption device for slides. J. Roloff and H. Hautsch, Germany. 9-29-42.

(22) 2,154,915. Lathe, particularly to means for automatically stopping the travel of the tool carrier or carriage in lathes provided with stops for the carriage which are relied upon to automatically interrupt the carriage feed. A. Ohera, Czechoslovakia. 4-18-39.

(22) 2,305,792. Device for shifting the cross-feed and the longitudinal feed of the tool carrier of machine tools. W. Mobius and H. Hautsch, Germany. 12-22-42.

(29) 1,664,968. Lathe whose headstock comprises a fixed shaft adapted to carry a fixed point and a movable shaft concentric with said fixed shaft. E. Coenen, Belgium. 4-3-28.

(29) 2,297,433. Reduction gear attachment. J. Roloff and H. Hautsch, Germany. 9-29-42.

(32) 2,322,972. Device for the protection of the guiding surfaces of the slides of machine tools. M. Rumpf, Belgium. 6-29-43.

(34) 1,695,763. Apparatus for machining polygonal parts on ordinary lathes. A. Hofstee, Netherlands. 12-18-28.

(36) 1,636,898. Tool holder for cutting off pieces of work. E. Bugatti, France. 7-26-27.

(40) 1,725,331. Surface plate for wheel lathes of the type in which jaws are provided for engaging the tire or rim of a driven wheel on the inside. E. Blau, Germany. 8-20-29.

(40) 1,901,942. Device for turning pistons rings. A. Abramson, Czechoslovakia. 3-21-33.

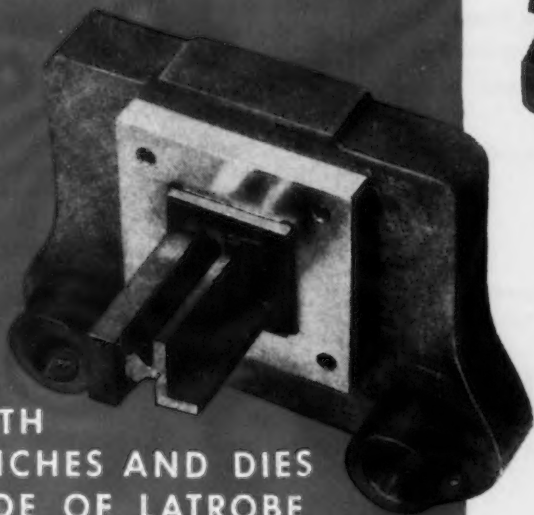
LATROBE

MANGANO *and* MANGANO SPECIAL

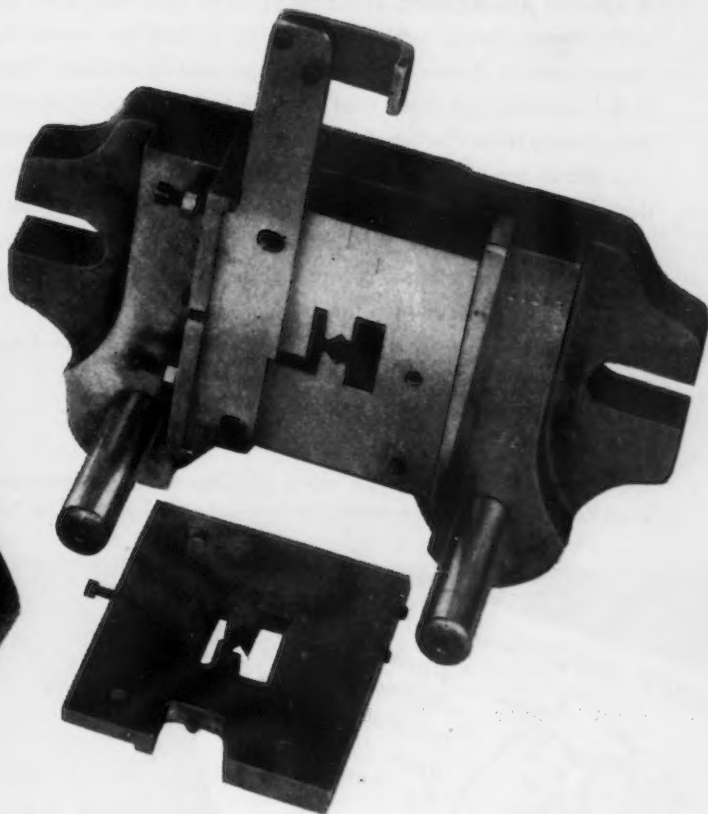
OIL HARDENING *Die Steels*



ACCURATE SHAPES
EASILY FORMED



WITH
PUNCHES AND DIES
MADE OF LATROBE
OIL-HARDENING STEEL



FOR THIS
COMMUTATOR

THE illustrations show one of many jobs involving the production of component parts vital to our war machines. This type of work often demands the use of oil-hardening tool steel with assured minimum distortion.

In such cases, you can depend upon Latrobe Mangano or Mangano Special Die Steels. Write for information.

TYPICAL ANALYSIS

	C	Si	Mn	Cr	W
Mangano	.95	.30	1.65	.20	—
Mangano Spec'l	93	.30	1.20	.50	.50



Latrobe ELECTRIC STEEL COMPANY

MAIN OFFICES and PLANT - LATROBE, PENNSYLVANIA

JOMAC

HEAT-RESISTING GLOVES

(and Long-Wearing, too!)

A special pile-knitting machine is used to achieve the remarkable Jomac Fabric which is helping to lick the many hot and heavy jobs in America's busy shops and foundries. This fabric is a loop-finished cloth that is thick with air-cells which dissipate heat. Jomac's "cushion" loops give added life and wear . . . allow breathing-space . . . make a sturdy, protective glove that allows constant handling of metals too warm to touch.

Jomac Gloves are washable, too. They can be laundered repeatedly, kept clean . . . and thus minimize the dangers of dermatitis and other skin infections.

(Jomac also makes the Regular Work Gloves—these are semi-heat-resisting.)

TEST THEM!

Just try JOMAC GLOVES on your stiffest jobs. Test them for heat-resistance, for wear, for washability, for economy, for increased production. Write for full details.

JOEY ON-THE-JOB SAYS . . .

"When they push a hot handling job my way I always give JOMAC a big hand!"



JOMAC INDUSTRIAL GLOVES

C. WALKER JONES CO.

6135 N. Lambert St., East Germantown, Philadelphia 38, Pa.

Industrial Statistics Committee Organized

Washington

• • • Determination of a program of industry statistics necessary as a guide to government and industry during the difficult conversion period and the subsequent postwar era has been undertaken by the Department of Commerce with the advice and assistance of other important agencies of the government, according to an article in the May issue of Domestic Commerce, an official publication of the Department.

Jesse Jones, Secretary of Commerce, initiated the movement by designating the Department of Commerce to outline such a program. He followed this by inviting representatives of the other important government departments to meet with the committee. At this meeting the representatives of these government departments were asked to advise as to the character and extent of the statistical program for servicing their needs and their cooperation sought in the detailed development of the program.

The inter-department committee included six representatives of the Bureau of the Census and the Bureau of Foreign and Domestic Commerce and three representatives of the office of the Secretary of Commerce. Other government departments represented were: Federal Reserve System, Department of Labor, Bureau of the Budget, Tariff Commission, Department of Interior, Treasury Department, WPB, Department of Agriculture, and the Social Security Board.

Many of the statistical series previously published by the Department of Commerce, particularly in the industrial field, have been suspended for security reasons. Numerous current reports have been suspended, and, in accordance with the authority granted under the Second War Powers Act, the 1941 and 1943 Census of Manufacturers were abandoned. This made it possible for the facilities of the Census Bureau to be used in work related directly to the administrative needs of the war agencies. For this reason no general statistics on manufactures are available for any year since 1939. The large volume of industrial statistics currently to be collected for the WPB and other administrative agencies are primarily of an operating nature and are not available for public distribution.

The Department of Commerce is preparing to resume its basic respon-



It has always been the policy of the Metal & Thermit Corporation to pay special attention to the development of electrodes for welding special steels. Murex Carbon Moly. 50, Molex and Type M, for example, are outstanding in their performance for welding carbon-molybdenum steel plate, castings, high pressure, high temperature piping and pressure vessels. Murex R.C. and C.F., for the repair and welding of air-hardening steel castings are among the electrodes developed to meet the needs of war production.

As the electrode requirements of fabricators change with the advent of industrial conversion, suitable Murex Electrodes will be available.



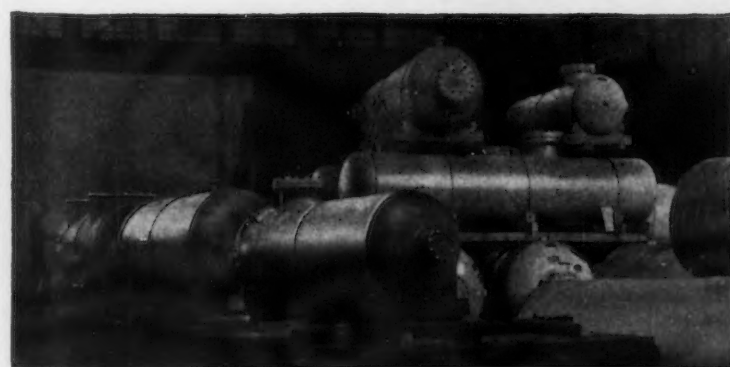
PROVIDING HEAT AND FRESH AIR FOR OUR COMBAT VESSELS, these heating units, produced by McQuay, Inc. of Minneapolis, must be rugged to withstand gunfire shock and near miss bomb concussion. To combine sturdy construction with light weight, welded construction using Murex Electrodes was adopted for the heater casings;



HUGE TURBINES FABRICATED WITH MUREX ELECTRODES by S. Morgan Smith Company, world's largest exclusive turbine builder. The illustration shows welding of a three-way branch inlet of a Vertical Impulse Turbine. Advantages of arc welding are: elimination of possible defects of complicated castings; less metal used; figuring of exact weights possible, thus enabling manufacturer to keep within estimates. Down-hand Murex Electrodes are used.



THIS 7½-TON STEEL CYLINDER on an 800-ton hydraulic press developed a crack 20 inches long and after preparation for welding 3 inches wide, and from 4½ to 6½ inches deep. Preheated 9 hours at about 700° F., this temperature was maintained during 17 hours of continuous welding with Murex Type F ¼ inch rods. The Detroit & Cincinnati Welding Company report that cylinder wall distortion was only about .0015" and that the flange moved only .004".



PRESSURE TANKS FOR HIGH OCTANE GAS, produced in quantity by The Bigelow Company of New Haven, Connecticut, are welded with low alloy Murex Electrodes to withstand pressures of from 100 to 600 pounds.

MUREX

ARC WELDING ELECTRODES

METAL & THERMIT CORPORATION

120 Broadway, New York 5, N. Y.

ALBANY • CHICAGO • PITTSBURGH
SOUTH SAN FRANCISCO • TORONTO



Specialists in welding for nearly forty years. Manufacturers of Murex Electrodes for arc welding, and of Thermit for repair and fabrication of heavy parts.

FENN PLANTS are set for ACTION



Building War Products Today Peace Time Products Tomorrow

FENN Plants have had years of experience in the design and building of special machinery. That is why they were able to turn quickly to war production and turn out the precision parts and assemblies needed by the builders of such famous fighter planes as the Navy's Corsair; why they have been able to work with war plants in practically every industrial center supplying them with vital parts and assemblies needed to complete machines, guns, and equipment.

Fenn for Special Machinery

FENN designers and engineers are accustomed to working at close tolerances in the machining of precision fitted parts. They have the plants and facilities to handle almost any production job calling for exceptional training and experience. Consultation is invited and involves no obligation. Are your plans in the blueprint stage? If you plan to build a machine or assembly and want an organization with skill and long experience to build it, get in touch with FENN.

THE FENN MANUFACTURING CO.
HARTFORD, CONNECTICUT

NEWS OF INDUSTRY

sibilities in the collection, analysis and dissemination of business information as soon as the progress of the war will permit.

Much current data may be suitable with moderate changes for continuance after the war. It is the desire of the Department of Commerce to examine carefully the current statistics and to develop a program concerning them in order that the wartime series which will fit into a permanent statistical structure may be continued without interruption.

The hope is to formulate a program for industrial statistics (and sometime later for all other business statistics) that will satisfy the major needs of government. It is realized, of course, that for regulatory and other special purposes of government, certain types of information will be needed that cannot be included in a basic schedule of industrial statistics. However, it is believed that a considerable amount of overlapping might be eliminated.

Steps in Termination Are Listed in New Free Booklet

•••Lyon Metal Products, Inc., Aurora, Ill., is distributing without charge a new booklet titled "How One Company Organized to Handle War Contract Terminations."

This company had several thousand contracts. When terminations started the problem was how to compile the necessary facts and figures so that claims could be presented and paid in the quickest possible time.

A top company executive was put in charge of the program of organizing procedures and personnel so that each termination was handled according to plan, with a time limit on each departmental operation.

The fast and satisfactory handling of termination claims attracted the favorable attention of termination officials who suggested that the plan be put into booklet form for the benefit of firms who had not yet had the experience. The booklet gives a suggested breakdown of termination duties by departments. It sets time limits for each department. It illustrates 14 practice-proved forms which the company designed to expedite the work. The book makes no attempt to "interpret regulations." The preparation of this book was suggested after it had been reviewed by Chicago Ordnance, Army Service Forces at Washington, and the National Association of Manufacturers.

BERLIN-TOKYO EXPRESS



DAY after day, carload after carload of fabricated sections leave our plant, routed Industry to Military, and consigned to Victory!



Whether it be war-time or post-war steel problems, why not avail yourself of the facilities of this experienced, resourceful organization?

THE LEVINSON STEEL CO.

Fabricated Structural Steel . . . Warehouse Steel Products

PITTSBURGH, PA.

LS-2

Aluminum Use Eased In Safety Equipment

Washington

• • • WPB on May 1 announced the removal of restrictions on the use of aluminum, alloy steel, and certain other materials from the order controlling the manufacture of safety equipment. Aluminum may now be used to the extent permitted by order M-1-i, and alloy steel may be used for any safety equipment. However, special alloy steels (other than NE triple alloy) are still controlled by the WPB Steel Division.

Other changes made in order L-114 as amended follow: Restrictions on asbestos cloth, plastics, and elastic fabrics are removed. Chromium is permitted in alloy steels and in plating of safety equipment where the plating has a functional purpose. Safety shoes and warning signs are no longer covered by the order, since they are controlled by orders M-217 and L-29 respectively.

Former restrictions on the use of copper, nickel, and tin remain unchanged. Safety items covered by L-114 include guards, goggles, shields, safety cans, safety clothing, respirators, inhalators, headgear, resuscitating apparatus, and protective creams.

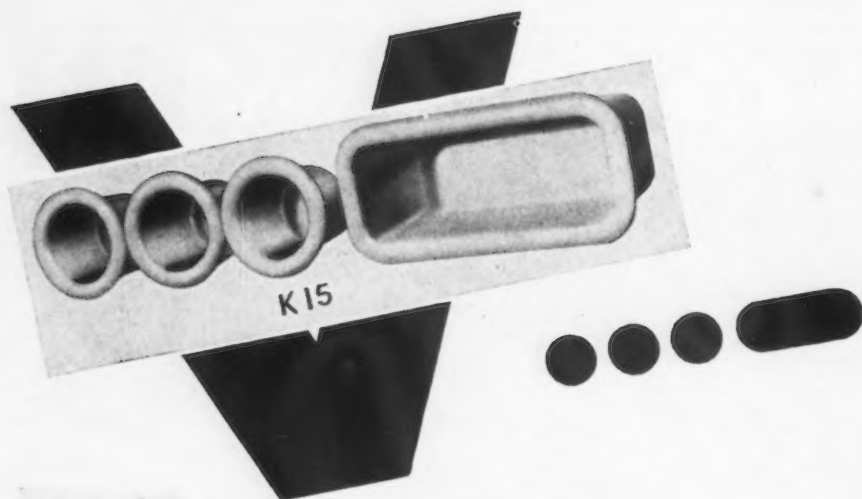
Order M-1-i permits the use of aluminum in safety equipment, as defined in L-114, where copper, copper base alloy, or aluminum was used in commercial production in the United States in 1939, 1940 or 1941. The changes made in order L-114 will give manufacturers of safety equipment a freer rein in the use of materials, and will result in better products and a saving in manpower, WPB said.

Michigan May Spend \$120,000,000 on Highways

Lansing, Mich.

• • • A very substantial market for structural and reinforcing steel in the postwar period is indicated if a peacetime construction program of Michigan State Highway Department is approved.

The planning calls for expenditures of approximately \$120,000,000 intended to put the 9400-mile trunk line system of Michigan into first-class condition with new highways, grade separations, bridges and crossing protection.



These "three-dots-and-a-dash," as well as other sizes and shapes of Amsco Alloy pots and pans, are working for Victory through the aircraft and ordnance parts heat treated in them.

Proper analysis is not enough! Sound metal is equally important. Controlled analysis, coupled with rigid x-ray inspection and high pressure tests, assure you of optimum performance from each Amsco Alloy pot.

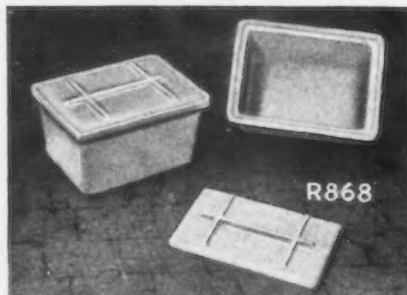
Boxes, trays and furnace fixtures are made to the same standards of skill and quality as Amsco pots. Laboratory controlled production insures the good foundry practice that results in sound castings.

Amsco Alloy pots, pans and boxes for carburizing and heat-treating are available in many different patterns: small, medium, large; round, oblong, square; shallow or deep.

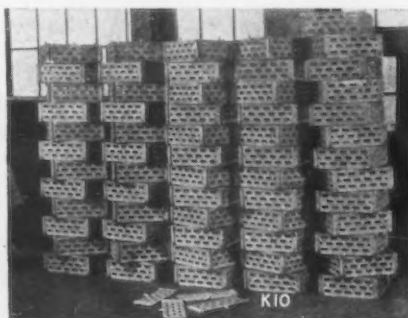
Ask for Bulletin 1041-A on Amsco Alloy heat treating containers.



A few of the many sizes of Amsco Alloy cyaniding pots.



Amsco Alloy non-sectional carburizing box. Any size or shape is also available in the patented sectional "Flexbox" design.



These "Flexboxes" fit into trays so that small pieces charged into them will not roll off, thus increasing carrying capacity of the trays.

Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois

FOUNDRIES AT CHICAGO HEIGHTS, ILL.; NEW CASTLE, DEL.; DENVER, COLO.; OAKLAND, CALIF.; LOS ANGELES, CALIF.; ST. LOUIS, MO.
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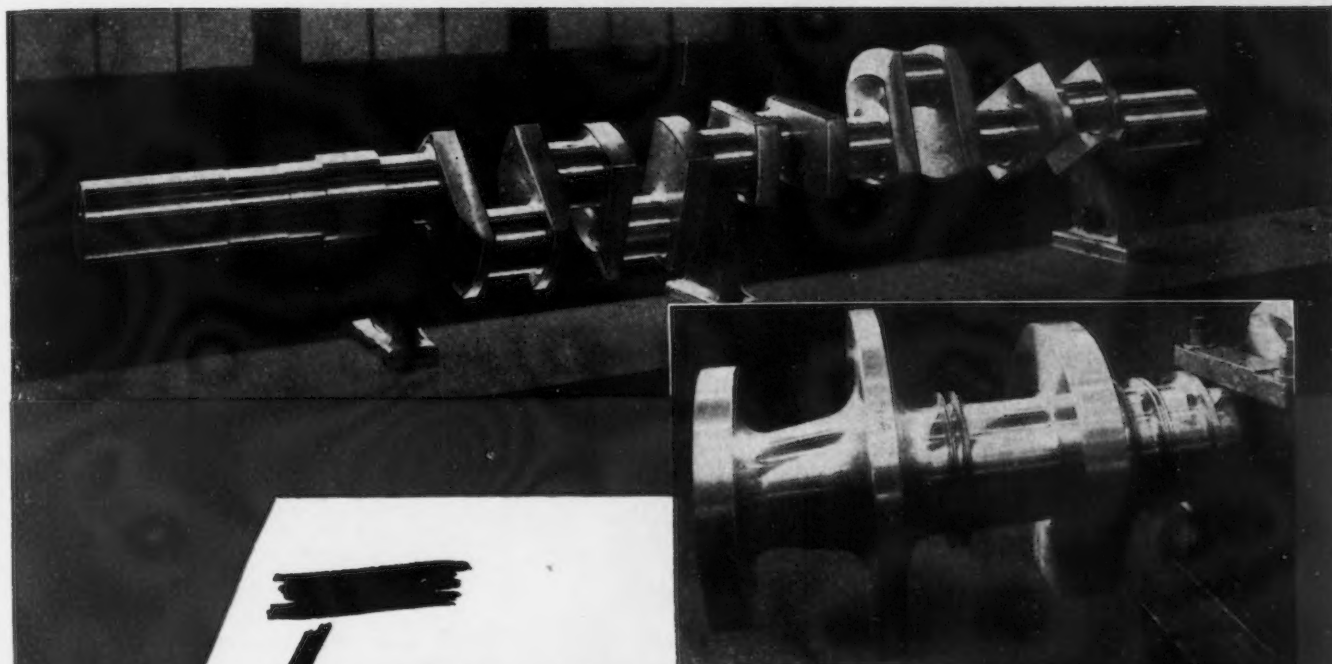
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TITUSVILLE

CRANKSHAFTS

for DIESEL ENGINES

USED SUCCESSFULLY BY THE LEADING ENGINE BUILDERS FOR MANY YEARS

Between power and action the crankshaft on Diesel engines is the deciding factor. Only craftsmen with long years of experience,—utilizing modern production facilities,—can produce dependable crankshafts to meet the most minute tolerances and perfect balance. This combination of Struthers Wells engineering ability and experienced craftsmanship have been constantly utilized by the leading Diesel engine builders for many years.

Titusville Forge engineers are at your service any time!



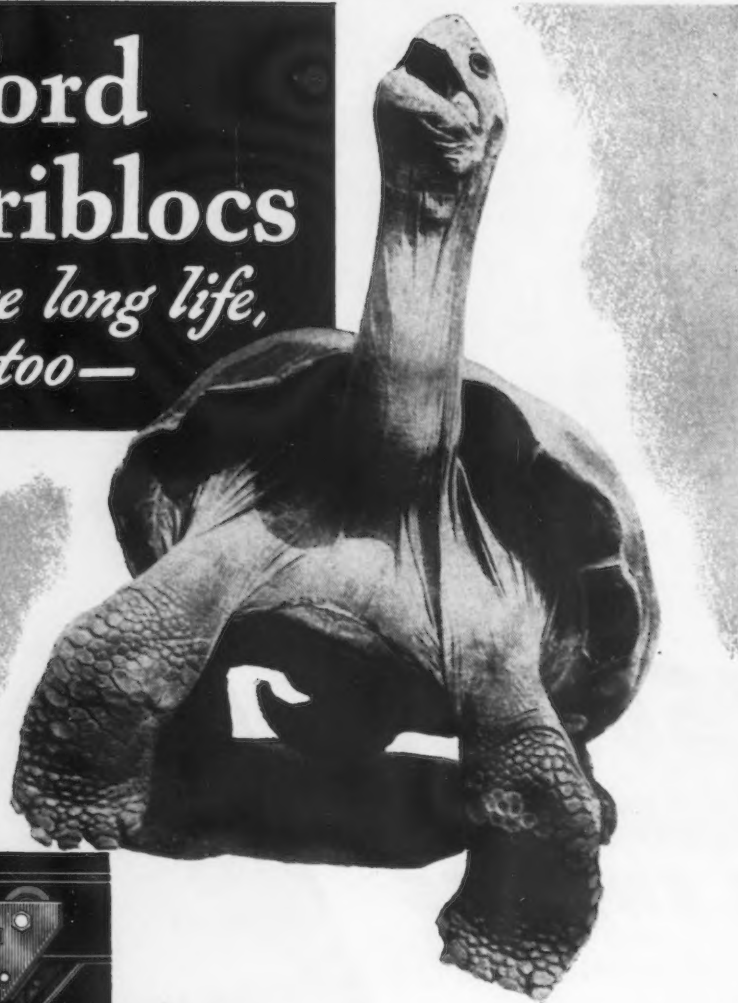
*freely flying over 3 plants—THE
ARMY-NAVY "E" for outstanding
and production performance.*

STRUTHERS WELLS CORPORATION

TITUSVILLE FORGE DIVISION

TITUSVILLE, PENNSYLVANIA

**Ford
Triblocs**
*have long life,
too—*



The giant tortoise is famed for its long life. **FORD TRIBLOCS** have amazing endurance, too. Given proper care—they are up on your ceiling for the duration of your plant. They are ideal for constant hard usage. Spur gear construction, ball-bearing equipped, and many other features that assure enduring efficiency, safety and low maintenance cost. Capacities: $\frac{1}{4}$ to 40 tons.

FORD SCREW HOISTS are built primarily for jobs on which smooth operation and accurate spotting of loads are required. Light weight; highly portable. Capacities: $\frac{1}{2}$ to 5 tons.

FORD DIFFERENTIAL HOISTS are constructed for intermittent service where speed, portability and price count. Capacities: $\frac{1}{4}$ to 2 tons.

FORD HOISTS are manufactured by the Ford Chain Block Division of American Chain & Cable, Bridgeport. Offices at Philadelphia, Chicago, Denver, Los Angeles, Portland, San Francisco.

Order from Your Distributor

AMERICAN CHAIN & CABLE COMPANY, INC.

BRIDGEPORT • CONNECTICUT



NEWS OF INDUSTRY

**Tempo of Lend-Lease
Ups as Invasion Nears**

Washington

• • • In the 60 days between Jan. 1 and Feb. 29, 1944, over 2100 lend-lease planes, almost 2000 tanks and over 60,000 other military motor vehicles including tank destroyers, trucks and jeeps, were sent from the United States to the forces of our allies fighting the Germans and the Japanese. That was almost 250 planes, over 230 tanks and 7000 other military motor vehicles every week. This was announced April 26 by Leo T. Crowley.

Between March 11, 1941, and March 1, 1944, more than 30,000 planes in all were sent to the forces of the other United Nations from the United States. Over 23,000 of these planes were lend-leased and the allies purchased almost 7000 for cash. In the same period almost 25,000 tanks and over 800,000 other military motor vehicles were dispatched to our allies. Of the tanks over 23,000 were sent under lend-lease and over 1500 were purchased for cash. Of the other military motor vehicles almost 550,000 were sent under lend-lease and over 250,000 were purchased for cash.

"HYDRAULIC PACKAGE": This new **PESCO** hydraulic package simplifies aircraft hydraulic controls, especially in larger ships. It combines a reservoir, an electric motor, a gear pump, a relief valve, and a pressure switch into a unit weighing 8 lb.



10 for 10



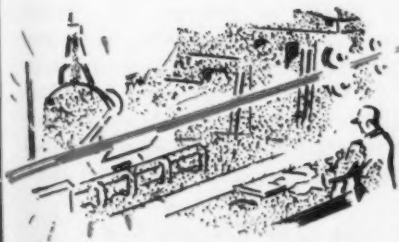
Ten Continuous Butt Weld Mills* in Operation . . .

*New Type for Sizes
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Plans for the first continuous butt weld mill installation indicated the need for ingenuity in working out the special heating problems involved. Salem assumed and fulfilled these responsibilities on the original installation, producing a satisfactory product at low cost.

The success of this pioneering can be appraised by the fact that ten mills have been installed since that time and on each of the ten, a Salem Furnace carries out the heating operation . . . ten furnaces for ten mills.



Special Furnaces for Special Problems

Salem designs and builds all types of heating and heat treating furnaces . . . any fuel . . . any size . . . for any type of ferrous or

non-ferrous material.

In your war production or in changing over from war production, you probably have questions about heating. It will be well worth your while to take

advantage *now* of Salem's experience in designing and building furnaces for individual requirements. An inquiry today may save you precious hours tomorrow.



SALEM ENGINEERING CO. • SALEM, OHIO

Laminated Glass Tested for Aircraft Structural Members

Dayton, Ohio

• • • Tests of an Army basic training plane equipped with a glass reinforced plastic fuselage, side panels, and tail cone, have culminated a research program initiated by the Army Air Forces Materiel Command, Wright Field, and aimed at developing high strength plastic structural materials for use in aircraft construction.

The experimental plastic fuselage is of sandwich construction, consisting of a balsa wood core between an inner

Photographs of sample aircraft parts made of laminated glass are shown in THE IRON AGE, May 4, 1944, page 101.

and outer skin of plastic reinforced with fibrous glass cloth. Ground destruction tests of three fuselages of the same design—one of glass reinforced plastic, one of metal, and one of plywood—indicate that for equivalent weight the glass sandwich fuselage is considerably the strongest.

On a strength-weight basis the glass reinforced fuselage is 50 per

cent stronger than the metal fuselage and 80 per cent stronger than the wooden fuselage now in service. Firing tests have indicated that the glass reinforced fuselage would be satisfactory under gunfire. The material did not flower and high explosive projectiles failed to detonate because of the low density of the material.

The fuselage, side panels and tail cone were fabricated at Wright Field. Research in the fabrication of the glass reinforced laminates and their physical properties was conducted in the laboratories of Owens-Corning Fiberglas Corp., at Newark, Ohio. Resin manufacturers who cooperated by furnishing resins for the research conducted in the Fiberglas laboratories are: American Cyanamid Co.; Marco Chemicals, Inc.; Plaskon Division, Libbey-Owens-Ford Glass Co.; Monsanto Chemical Co.; Columbia Chemical Division, Pittsburgh Plate Glass Co.; Dow Chemical Co.; and the Bakelite Corp. These resins, in combination with glass fibers, lend themselves to low cost production methods adaptable to experimental and production designs. Each of the various com-



CATAPULT GUNS: These plane launching catapult guns at the U. S. Naval Ordnance Plant, Canton, Ohio, are being inspected by Naval and Westinghouse inspectors. A blank shell, fired in the catapult gun, causes gases in the gun to rapidly expand, pushing against a piston. The piston drives a cart along the catapult track and the plane, astride the cart, is launched into the air.

To maintain your best assembly speed use true-threaded CLEVELAND *Class 3 Fit* CAP SCREWS

Accurately formed and threaded, plus extra strength through Kaufman Process manufacture that lets you tighten down hard without fear of breakage. Write for Catalog F.



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FASTENERS**

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MADE BY THE ORIGINATORS OF THE KAUFMAN PROCESS FOR GREATER STRENGTH AND ACCURACY

binations of glass and resin tested was fabricated into 0.25 and 0.50-in. thick laminated sheets. The sheets were cured at a pressure of 15 lb. per sq. in. in an electrically heated hot air oven.

Tensile strengths were found to be proportional to the amount of glass present in the laminates, and varied from 43,360 to 54,720 lb. per sq. in. Compression strengths as high as 56,820 lb. per sq. in. were obtained. Flexural values ranged between 45,350 and 84,600 lb. per sq. in. Impact strengths of unnotched specimens were from 28.82 to 31.25 ft.-lb. These values are for cross laminated glass cloth. Strength values approximately twice as high may be obtained with parallel laminated cloth.

Freight Car Orders Set

• • • To replace Army railroad cars cancelled in January, WPB has authorized construction of the following in the fourth quarter using third quarter materials: American Car & Foundry Co., 110 35-ton refrigerators and 430 30-ton box cars. Mt. Vernon Car Co. and Pullman Standard Mfg. Co., each 1000 30-ton box cars. General American Transportation Corp., 111 5000-gal. tank cars.

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For excellence in production of extremely precise,
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USE

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To meet today's wartime requirements for turning out closer, more accurate work with smoother, finer finishes in wet grinding all types of steel, many leading concerns are using Oakite Grinding Compound.

It is their preferred choice... their **STANDARD** and **APPROVED** material... for this essential production operation for several important reasons. First, Oakite Grinding Compound provides maximum cooling and proper lubricity. Second, it keeps wheels **CLEAN** and **FREE-CUTTING**... reduces loading and glazing to a minimum so that less dressing is required. In addition, this superior coolant helps prevent rusting, helps keep supply tank and lines clean, has high resistance to rancidity, is odor-free and economical, has long solution life.

20-Page Booklet FREE!

Gives specific directions and formulas for using Oakite Grinding Compound. Also contains formulas for cutting and machining ferrous and non-ferrous metals. Write for your **FREE** copy **TODAY!**

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NEWS OF INDUSTRY

Maritime Commission Announces Completion of 154 Ships During April

Washington

• • • With 10 of the 154 ships delivered during April of the fast, new Victory cargo type, the U. S. Maritime Commission announced that a considerable change in the trend of its construction program is underway. The swing to fast ships is proceeding as rapidly as possible, and it is anticipated that the ratio of 11 fast type to eight of slower types will make up the 1944 tonnage.

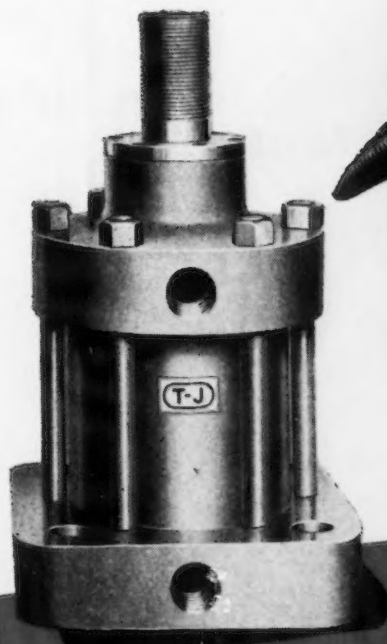
Delivery of 154 vessels (totaling 1,593,691 deadweight tons) during April brought the 1944 total to 564 ships put into service during the four-month period. This accounted for about 5,706,642 deadweight tons. During the same period of 1943, which was the banner shipbuilding year, 536 ships of 5,360,712 deadweight tons were delivered.

The drop from 83 Liberty ships delivered in March to 79 in April evidences the change to fast ships. Demands of the armed forces have been a contributing factor in the alteration of the construction program, and 15 special type vessels for military service were delivered during the month. Also delivered during April were 20 standard C-type vessels; 17 standard large tankers; five coastal cargo ships; one concrete cargo vessel; five concrete barges; one coastal tanker; and one sea-going tug.

West Coast yards delivered 62 of the 154 ships, while East Coast yards put 55 into service; Gulf Coast yards delivered 36; and the Great Lakes area delivered one.

The number and types of vessels built by all yards during April were as follows:

Shipyard	No. of Vessels	Type of Vessel	Shipyard	No. of Vessels	Type of Vessel
Alabama Dry Dock & Shipbuilding Co., Mobile, Ala.	3	Tankers	Kaiser Cargo, Inc., Richmond, Cal.	1	Special Type
Avondale Marine Ways, Inc., Westwego, La.	1	Coastal Cargo	Kaiser Co., Inc., Richmond, Cal.	2	Special Types
Barrett & Hilt, San Francisco	1	Concrete Barge	Kaiser Co., Inc., Swan Island, Portland, Ore.	4	Tankers
Bethlehem-Fairfield Shipyard, Inc., Fairfield, Baltimore	15	Libertys	Kaiser Co., Inc., Vancouver, Wash.	5	Special Types
Bethlehem-Sparrows Point Shipyard, Inc., Sparrows Point, Md.	1	Tanker	MacEvoy Shipbuilding Corp., Savannah, Ga.	3	Concrete Barges
California Shipbuilding Corp., Wilmington, Cal.	2	Libertys	McCloskey & Co., Tampa, Fla.	1	Concrete Cargo
Concrete Ship Constructors, National City, Cal.	1	Concrete Barge	Marinship Corp., Sausalito, Cal.	3	Tankers
Consolidated Steel Corp., Ltd., Wilmington, Cal.	4	C-1 Cargo	Moore Dry Dock Co., Oakland, Cal.	5	C-2 Cargo
Delta Shipbuilding Co., Inc., New Orleans	6	Libertys	North Carolina Shipbuilding Co., Wilmington, N. C.	6	C-2 Cargo
Federal Shipbuilding & Dry Dock Co., Kearny, N. J.	1	Special Type	New England Shipbuilding Corp., South Portland, Me.	10	Libertys
General Ship & Engine Works, East Boston, Mass.	1	Sea-Going Tug	Oregon Shipbuilding Corp., Portland, Ore.	6	Victory Cargo
Globe Shipbuilding Co., Superior, Wis.	1	Special Type	Pendleton Shipyards Co., Inc., New Orleans	1	Coastal Cargo
Gulf Shipbuilding Corp., Mobile, Ala.	1	C-2 Cargo	Pennsylvania Shipyards, Inc., Beaumont, Tex.	2	C-1 Cargo
Houston Shipbuilding Corp., Houston	7	Libertys	Permanente Metals Corp., Richmond, Cal.	22	Libertys
Ingalls Shipbuilding Corp., Pascagoula, Miss.	1	C-3 Cargo	Pusey & Jones Corp., Wilmington, Del.	1	C-1 Cargo
J. A. Jones Construction Co., Inc., Brunswick, Ga.		Libertys	St. Johns River Shipbuilding Co., Jacksonville, Fla.	4	Libertys
J. A. Jones Construction Co., Inc., Panama City, Fla.	4	Libertys	Southeastern Shipbuilding Corp., Savannah, Ga.	3	Libertys
			Sun Shipbuilding & Dry Dock Co., Chester, Pa.	5	Tankers
			Todd-Galveston Dry Docks, Inc., Galveston, Tex.	1	Coastal Tanker

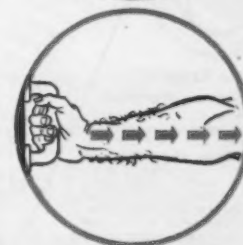
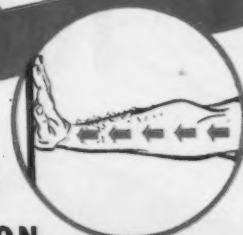


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IN ANY DIRECTION**

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Whether it's a mechanical movement requiring pressure to clamp...press...raise...or shift—T-J Cylinders do the job *right!* Designed for compactness, these Cylinders are accurately machined for correct

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RIVITORS...AIR AND HYDRAULIC CYLINDERS...CUTTERS...CLINCHORS

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are available for post-war exploitation. Both are patented and have passed risk money stage. Only direct negotiations with highly responsible manufacturers will be considered.

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Fast Tough



Complete Range of Metal Sawing Machines

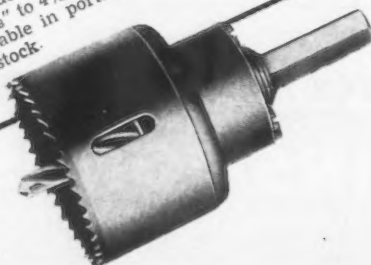
Being the largest exclusive manufacturer of metal sawing machines and blades, both hack saw and hand saw type, we have the correct answer to your cut-off problems. Each MARVEL model has a distinct application, so write us and we will send our catalog, price, and recommendation for the saw to fill your requirements most efficiently. MARVEL sawing engineers are also available to discuss and analyze your cut-off work. (Without obligation of course)

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Heavy feed at high speed spells doom to the ordinary hack saw blade; down-time for your machine, extra expense in money, man hours, and production. The MARVEL Hack Saw Blade, because it is positively unbreakable under these conditions, should be "a must" tool in every efficiently operated shop. A tough alloy steel back is electrically welded to high speed steel teeth, producing a blade that can be pulled to almost unlimited tension; can withstand extra heavy feeds and the heat and abrasion of high speed heavy duty sawing.

The same exclusive unbreakable feature of MARVEL Hack Saw Blades is also a feature of MARVEL Hole Saws, giving these saws the ability to stand up under abuse. MARVEL Hole Saws cut holes from $\frac{3}{8}$ " to $4\frac{1}{2}$ " diameter in stock up to $1\frac{1}{8}$ " thick. Usable in portable drill, drill press, or lathe tail stock.

Heavy feed
at
high speed



NEWS OF INDUSTRY

DPC and Army Contract Awards

Washington

• • • The Defense Plant Corp., RFC subsidiary, has authorized the following contracts:

Rhom & Haas Co., Philadelphia, to provide additional equipment at a plant in Bristol, Pa., at a cost in excess of \$90,000, making a total commitment of more than \$765,000.

Superior Tool & Engineering Co., Muncie, Ind., to provide additional equipment at a plant in Muncie at a cost in excess of \$30,000, making a total commitment of more than \$135,000.

Georgia Motor Express, Inc., to provide automotive equipment to be operated in Georgia, Alabama and North Carolina, at a cost in excess of \$60,000.

H. K. Porter Co., Inc., Pittsburgh, to provide additional equipment at a plant in Pittsburgh at a cost in excess of \$75,000, making a total commitment of more than \$450,000.

Globe Steel Tubes Co., Milwaukee, Wis., to provide equipment at a plant in Milwaukee at a cost in excess of \$200,000.

Servel, Inc., Evansville, Ind., to provide additional equipment at a plant in Evansville at a cost in excess of \$40,000, making a total commitment of more than \$135,000.

Atlas Industries, Inc., Woodville, Ohio, to provide equipment at a plant in Woodville, at a cost in excess of \$100,000.

International Minerals & Chemical Corp., Chicago, to provide additional plant facilities at Austin, Tex., at a cost in excess of \$125,000, making a total commitment of more than \$18,975,000.

Pittsburgh Equitable Meter Co., Pittsburgh, to provide additional machinery and equipment at a plant in Oakland, Cal., at a cost in excess of \$580,000, making a total commitment of more than \$1,100,000.

National Distillers Products Corp., New York, to provide machinery and equipment at a plant in Cincinnati, Ohio, at a cost in excess of \$650,000.

National Distillers Products Corp., New York, to provide additional equipment at a plant in Louisville, Ky., at a cost in excess of \$240,000, making a total commitment of more than \$330,000.

Plymouth Rubber Co., Inc., Canton, Mass., to provide additional equipment at a plant in Canton at a cost in excess of \$70,000, making a total commitment of more than \$285,000.

National Distillers Products Corp., New York, to provide additional equipment at Elk Horn Forks Distillery, Franklin County, Ky., at a cost in excess of \$200,000, making a total commitment of more than \$250,000.

Chandler-Evans Corp., Dayton, Ohio, to provide additional equipment at a plant in Dayton, at a cost in excess of \$200,000, making a total commitment of more than \$2,700,000.

Youngs Bay Lumber Co., Inc., Roseburg, Ore., to provide additional facilities at a plant in Roseburg at a cost in excess of \$75,000, making a total commitment of more than \$1,000,000.

Textile Machine Works, Reading, Pa., to provide equipment at a plant in Wyomissing, Pa., at a cost in excess of \$750,000.

O'Sullivan Rubber Co., Inc., Winchester, Va., to provide equipment at a plant in Winchester, at a cost in excess of \$250,000.

COMING EVENTS

May 8—Association of Iron & Steel Engineers, spring conference, rolling mill committee, Pittsburgh.

May 9, 10—American Steel Warehouse Association, Inc., Chicago.

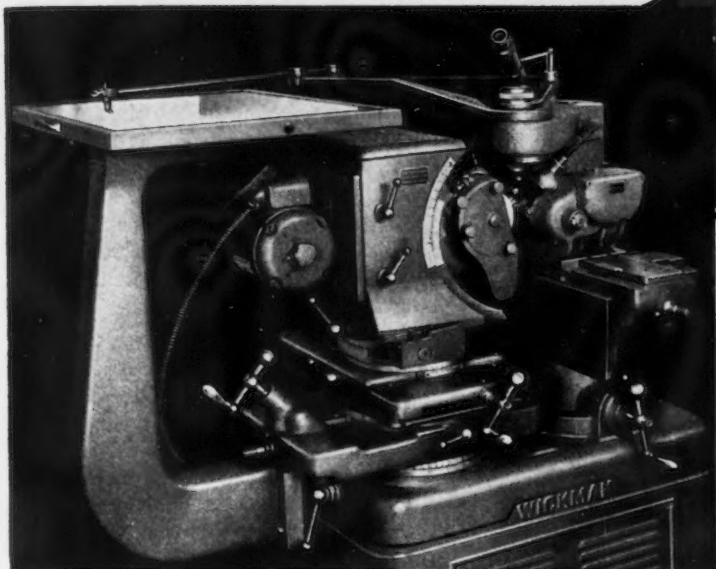
May 25—American Iron and Steel Institute, New York.

June 19-22—American Society of Mechanical Engineers, Pittsburgh.

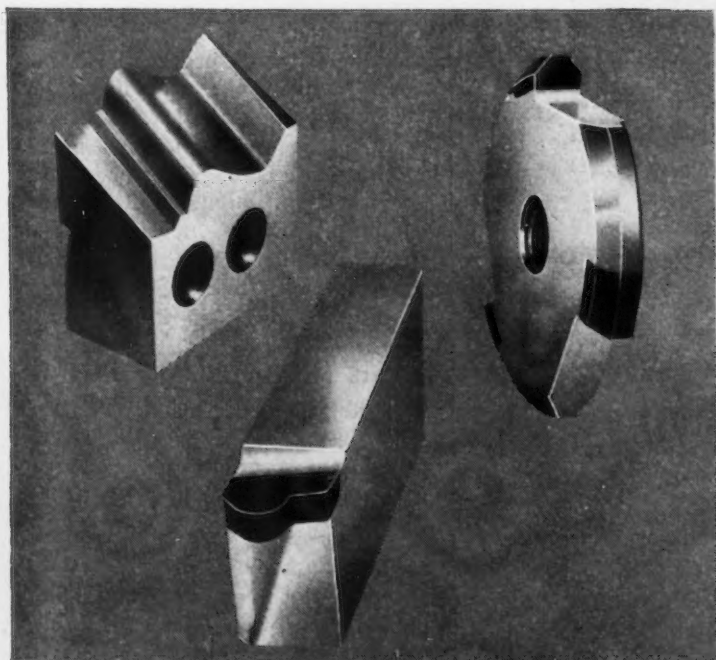
June 5-7—SAE National War Material Meeting, Detroit.

June 5-7—American Society of Refrigerating Engineers, Pittsburgh.

Batteries of Wickman PRECISION PROFILE GRINDERS



Shown above is the Wickman Profile Grinder on which is mounted the circular grinding attachment supplied as an extra for use on cylindrical work such as circular form tools.



AS MANY AS
22 AMERICAN-BUILT
MACHINES
NOW OPERATING
IN ONE PLANT

A true measure of the value of any machine tool can be found in the records of "repeat" orders. The Wickman Corporation customer list now shows a number of concerns who bought one Wickman Profile Grinder . . . and then placed orders for as many of these machines as were required to handle in their production all of the contour grinding work for which the Wickman machine is particularly suited. Every user has realized definite savings in both machining time and skilled manpower.

Shown at the left are three typical examples of work ground and inspected on the machine without use of radius dresser or formed wheel. While especially adaptable to cemented-carbide work, the grinding of contours in high speed steel as illustrated in the upper left is handled equally as efficiently.

FULL INFORMATION IS YOURS FOR THE ASKING

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A complete line of Welding Wire with particular emphasis on a complete range of Stainless Steel Welding Electrodes—a range so complete that from it you are certain to be able to select a rod that will deposit metal in the weld that equals the metal being welded.

A complete range of Shaped Wire in Carbon and Stainless Steels—diameters up to $\frac{3}{8}$ " and end section areas up to .250" square—shapes that include Triangles, Rectangles, Octagons, Hexagons, Keystones, Ovals, Half-rounds, etc. The kind of product that rates selection for use in aircraft control cables, as rifle springs, in vital parts of tanks, trucks and other important fighting equipment.

And General Wire such as Telephone wire, Spring wire, Bond wire, etc.

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NEWS OF INDUSTRY

Additional Irons Are Allocated by WPB

Washington

• • • WPB allocated on May 1 an additional 157,000 electric irons to be made in a group 2 zone. These will be made by the Westinghouse Electric & Mfg. Co. at its Mansfield, Ohio, plant. No production has as yet been scheduled with any plant in a group 1 zone, which is the tightest labor zone classification. As Westinghouse was thus able to cut in on the civilian production of electric irons at its Mansfield plant, WPB was compelled to allocate some production at a competing plant in the same city. This is represented by an output of 35,000 to be made by the Dominion Electrical Mfg. Co., of Mansfield.

The allocations announced amount to 193,625 electric irons. Allocations announced March 12 totaled 200,000 electric irons, which are being made by manufacturers located in group 3 and group 4 areas. New York City, the location of the additional 1625 irons to be made by the New York Pressing Machine Company, is in a group 4 area.

Lewis Foundry Begins Work On Navy Large Shell Contract

Pittsburgh

• • • The Lewis Foundry and Machine division of the Blaw-Knox Co., Grove-ton, Pa., has signed a contract with the U. S. Navy to produce large caliber explosive shells, according to W. C. Snyder, Jr., president. The plant will need an additional 100 to 150 machinists to carry on the operations.

With the installation of necessary equipment and new tools, which already has been started, the plant is expected to go into shell production by late summer. The finished shells will be shipped to naval arsenals.

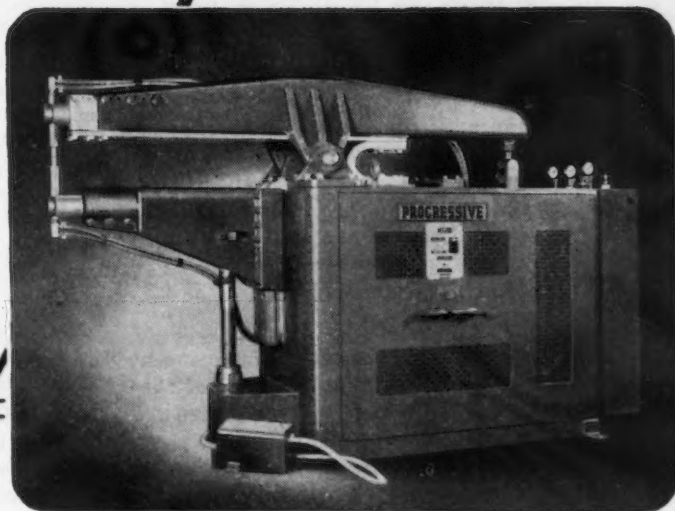
Until recently, Lewis Foundry was turning out mounts for 3-in. anti-aircraft guns for shipboard use.

Research by IBM Lauded

• • • Postwar plans to reorganize the foreign business of International Business Machines Corp. and similar plans for postwar domestic expansion based on 84 engineering projects in IBM laboratories were announced April 25 by President Thomas J. Watson. "I never have seen so much encouragement in our laboratories as there is today," he said.

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for STRUCTURAL ALUMINUM

Handles
 $\frac{1}{8}$ " to $\frac{1}{4}$ " 24-ST

Maximum welding
 Pressure 6500 lbs. at
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Companion model to the highly successful Progressive Model "B" the new model "C" for welding structural aluminum and alloy sections by stored energy embodies all the features which have contributed so much to the outstanding performance of the lighter model in welding Alclad between 0.016 to 0.081 ST.

These include the throwing of all rocker arm deflections into the vertical plane to provide a "spring follow up" during the weld, improving weld quality; a triple pressure system providing normal welding pressure, maximum welding pressure (after capacitor discharge) and a light pressure for point dressing. Outstanding too, is the rigidity of the machine.

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SEAM PROJECTION & BUTT • Electric Welding Equipment • PORTABLE GUN & PEDESTAL

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New Specifications for Valves Urged

Washington

• • • Proposed changes in specifications for valves and valve parts contained in Order L-252 have been recommended by W. B. Holton, Jr., production consultant for valves and fittings of the Shipbuilding Division, following meetings with members of the valve industry, WPB has announced. The proposed changes would save production man-hours and result in better products with consequent reduction in parts replacements, industry members believe.

Specifications for valves and valve parts in the present L-252 were to a large extent based on saving of materials that were critical 18 months ago, WPB said, and some of these materials now are more available.

Proposed changes in Order L-252 include:

1. Use of 12 per cent chrome iron stems and SAE 4140 steel bonnet bolting in 150-lb. steel valves, in addition to present permitted metals.
2. Use of brass rod, in addition to present permitted metals, for stems of outside screw and yoke iron valves.
3. Increase in the size range of swing check valves made of iron.
4. Addition of nickel alloy as a seat-

ing material for 250 lb. and higher pressure iron valves.

This change is recommended to establish consistency with other paragraphs of the present L-252 which permit its use in 150 lb. iron valves and 200 lb. and higher pressure brass valves.

Ruttenberg Quits WPB Post

Washington

• • • Harold J. Ruttenberg, WPB Steel Division assistant director in charge of manpower and CIO research director who took leave of absence for the duration of the USWA case against the steel companies, has resigned his WPB post.

Structural Orders Off

• • • Reports for March, 1944, by companies representing 77.2 per cent of the total average bookings of fabricated structural steel for bridge and building construction during the years 1923 to 1925, totaled 26,223 tons as compared with 36,355 tons in February and 32,009 tons for the corresponding month of last year, according to the

American Institute of Steel Construction. Reported shipments totaled 34,208 tons against 93,968 tons in the same month last year.

Electronics Program's Importance Is Stressed

• • • The importance of keeping the expanded military electronics program at its highest production level throughout 1944 was stressed May 1 in a letter to all manufacturers of electronic equipment and component parts suppliers from L. R. Boulware, operations vice chairman of WPB.

The Army-Navy Electronics Production Agency (ANEPA) is being dissolved and will not be active after May 15, the letter said, and the functions previously exercised by that agency will be absorbed and carried on by the Army, Navy and WPB according to the normal sphere of action of each. However, these organizational changes do not alter the rules of Limitation Order L-183-a, nor do they weaken the force and importance of the precedence list.

Electronic equipment manufacturers and component parts suppliers were urged by Mr. Boulware to note Interpretation 1 to Order L-183-a, setting forth the relation of the precedence list to scheduling, and the rules of Priorities Regulation 18 relating to frozen schedules.

Extra 4-hr. Shifts and Other Manpower Moves Are Urged

Chicago

• • • In a memorandum sent to 8000 local concerns by the Chicago Association of Commerce, employers were urged to scrape the bottom of the manpower barrel by employing, on the basis of 28 hr. a week or less, housewives, school students and persons already employed who may be able to take second jobs for a few hours daily. One method suggested was adoption by certain companies of extra four-hour shifts.

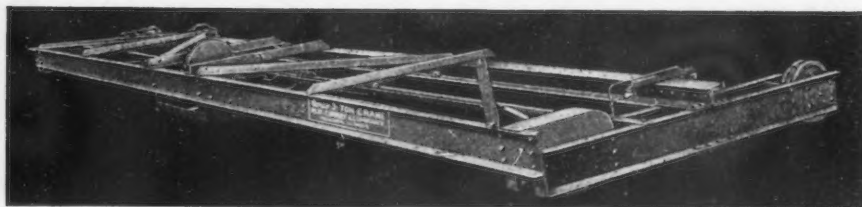
Machine Tool Industry's Production Being Studied

• • • The WPB Tools Division has embarked upon a machine tool industry survey to find out what per cent of plant capacity is used for making machine tools and parts, and what per cent is used for the making of other products, as well as the amount of idle capacity. Presumably the survey pertains to reconversion. Blanks have been mailed to builders.

CONCO

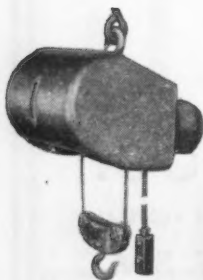
3-Motor Single Girder
CAB OR FLOOR
OPERATED

ELECTRIC CRANE . . .



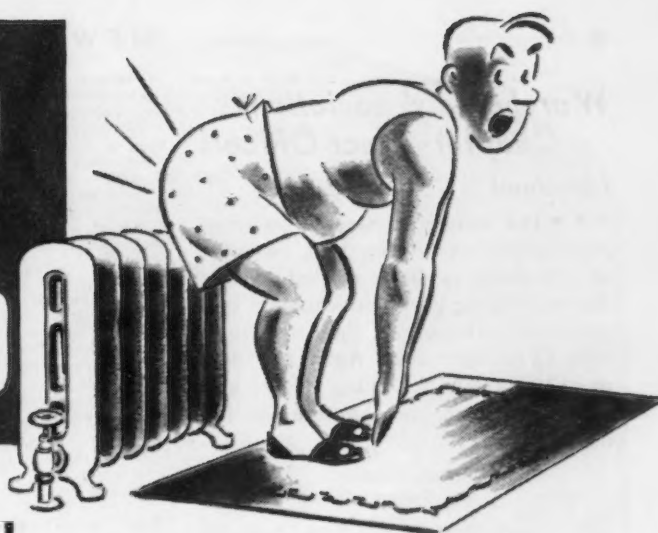
● Available in capacities of one through five tons for floor or cab operation. Simply, ruggedly designed for low first cost and maintenance. Used with Low Headroom Type Hoist, provides for maximum space coverage horizontally and vertically. Effective in even a minimum space. Write for Bulletin 2000.

Write for Bulletin 26000 describing the Torpedo Hoist shown. Three capacities 250 lb. — \$139.50, 500 lb. — \$149.50, 1000 lb. — \$159.50. Heavily, simply built, with Push Button Control. Outstanding in CONCO'S complete line of hand-powered and electric Cranes, Hoists, Trolleys.



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Builders Of Conco Torpedo Electric Hoist

HEATED *and* SQUEALED



NOT in the case shown below!
One-Third of the Grinding Time was Saved . . .
without Heating

Another War Production Test Run shows Cortland Chucks and Segments producing more at lower cost.

TEST FACTS: A large manufacturer of bearings . . . using a Blanchard No. 18 Vertical Surface Grinder . . . Wheel Speed 875 R.P.M.

WORK: Bearings—S.A.E. 52100 Steel hardened to 64 Rockwell C scale; 2.82 sq. in. surface ground per piece; 31 pieces per table load.

Detail	CORTLAND Chuck and Segments	Competitive Brand Formerly Used
Cubic inches of stock removed per inch in height of segments	350.0	87.5
Ampere readings	30	15
Dressings necessary	1	1
Work heat?	Cut cool with no noise	Heated work and squealed badly
Grinding time	112 sec.	180 sec.

Heavier feed could be used and better finish obtained with Cortland *Diagonal Shearing* Segments.

Why not find out just how Cortland Chucks and Segments can increase the quality and quantity of your grinding output? Write for our latest illustrated bulletin giving the complete Cortland performance story.

CORTLAND GRINDING WHEELS CORP.
 7 Cortland Street Chester, Massachusetts

Diagonal Shearing with Varying Contact Means Better Surface Grinding



A true segment, the grinding surface has narrow ends that *start* the work with minimum shock and resistance. Straight inner edge of segment passes diagonally across work with a *shearing* action that *cuts* and *removes* the metal. Varying contact area insures longer exposure to coolant—decreases heat—reduces segment wear—conserves power.

CORTLAND *Chucks and Segments*

Warehouse Association Chapters Elect Officers Cleveland

••• The American Steel Warehouse Association announced that 16 more of its chapters have elected officers for the coming year. Six chapters had previously announced their new officers (THE IRON AGE, April 27, 1944, page 108). The following officers will be in charge of the chapters for the next year:

Buffalo Chapter

President—C. S. Gedney, Joseph T. Ryerson & Son, Inc., Buffalo.
Vice-president—David C. Parks, Smith & Caffrey Co., Syracuse, N. Y.
Secretary-treasurer—J. A. Van de Mark, Service Steel Co., Buffalo.
*Chapter director—J. Frederick Rogers, Beals McCarthy & Rogers, Inc., Buffalo.

Central States Chapter

President—C. G. Bothwell, Edgar T. Ward's Sons Co., Chicago.
Vice-president—C. H. Bradley, W. J. Holaday & Co., Indianapolis.
Vice-president—L. B. Worthington, U. S. Steel Supply Co., Chicago.
*Secretary—T. B. Daniels, Jones & Laughlin Steel Corp., Chicago.
*Treasurer—L. B. Kidwell, General Steel Warehouse Co., Inc., Chicago.
Chapter director—H. V. Douglas, Central Steel & Wire Co., Chicago.

Cincinnati Chapter

President—D. L. McCubbin, Joseph T. Ryerson & Son, Inc., Cincinnati.

Vice-president—Charles Brown, Brown Steel Co., Columbus, Ohio.
Vice-president—Fred W. Solarek, Central Steel & Wire Co., Dayton, Ohio.
Secretary—J. W. Miller, S A E Steels, Cincinnati.

Treasurer—J. E. Merchant, Edgar T. Ward's Sons Co., Cincinnati.
*Chapter director—John Thiele, Miami-Dickerson Steel Co., Dayton, Ohio.

Colorado Chapter

*President—H. V. Waterman, Hendrie & Bolthoff Mfg. & Supply Co., Denver.
*Vice-president—J. H. Singleton, C. A. Crosta, Inc., Denver.
*Secretary-treasurer—A. M. Hays, Hendrie & Bolthoff Mfg. & Supply Co., Denver.
*Chapter director—H. V. Waterman, Hendrie & Bolthoff Mfg. & Supply Co., Denver.

Connecticut Chapter

*President—R. B. Shearer, C. S. Mersick & Co., New Haven, Conn.
*Vice-president—S. H. Hascall, Blodgett & Clapp Co., Hartford, Conn.
*Secretary-treasurer—G. S. Brouso, C. S. Mersick & Co., New Haven, Conn.
*Chapter director—R. B. Shearer, C. S. Mersick & Co., New Haven, Conn.

Detroit Chapter

President—J. Ivan Fiscus, Huron Steel Co., Inc., Detroit.
Secretary-Treasurer—Robert Jenks, Wheelock Lovejoy & Co., Inc., Detroit.
*Chapter director—E. W. Lynch, Union Drawn Steel Division, Republic Steel Corp., Detroit.

Missouri Valley Chapter

President—N. R. Patterson, Patterson Steel Co., Tulsa.
Vice-president—B. R. Kenworthy, Des Moines Steel Co., Des Moines.
Secretary-treasurer—J. A. Rudisill, George C. Christopher & Son Iron Works, Wichita.
*Chapter director—Henry Neef, Gate City Iron Works, Omaha.

New York Chapter

*President—Charles Kramer, U. S. Steel Supply Co., Newark, N. J.
Vice-president—Albert Bragg, Egleston Bros. & Co., Inc., Long Island City, N. Y.
*Vice-president—James P. Donnelly, Atlas Supply Co., Inc., New York.
*Secretary-treasurer—W. C. Hughes, Bright Steel Corp., New York.
*Chapter director—P. O. Grammer, Grammer, Dempsey & Hudson, Inc., Newark, N. J.

Northern Ohio Chapter

President—J. J. Halloran, Edgar T. Ward's Sons Co., Cleveland.
Vice-president—R. J. Foster, Republic Structural Iron Works, Cleveland.
Secretary-treasurer—J. P. McGough, Joseph T. Ryerson & Son, Inc., Cleveland.
*Chapter director—R. M. Beutel, Paterson-Leitch Co., Cleveland.

Northwest Chapter

President—John Greve, Minnesota Steel Supply Co., Minneapolis.
Vice-president—H. J. Turnstrand, Minneapolis Iron Store Co., Minneapolis.
Secretary—S. C. Brennom, Paper, Calmen-son Co., St. Paul, Minn.
Chapter director—John Greve, Minnesota Steel Supply Co., Minneapolis.

Philadelphia Chapter

President—J. J. Hill, Hill-Chase & Co., Inc., Philadelphia.
Vice-president—Arthur Collins, Horace T. Potts Co., Philadelphia.
Vice-president—John Drummond, Peter A. Frasse & Co., Inc., Philadelphia.
Vice-president—William H. Franklin, Edgcomb Steel Co., Philadelphia.
*Secretary-treasurer—J. M. Mead, Joseph T. Ryerson & Son, Inc., Philadelphia.
Chapter director—Leslie Edgcomb, Edgcomb Steel Co., Philadelphia.

Pittsburgh Chapter

President—H. E. Williams, Williams & Co., Inc., Pittsburgh.
Vice-president—W. C. Shuck, Lockhart Iron & Steel Co., Pittsburgh.
*Secretary—T. L. Lawry, Steel Products Co., McKees Rocks, Pittsburgh.
*Treasurer—F. B. Lorenz, Edgar T. Ward's Sons Co., Pittsburgh.
*Chapter director—A. W. Herron, Jones & Laughlin Steel Corp., Pittsburgh.

St. Louis Chapter

President—Milner Donovan, Donovan Iron & Supply Co., St. Louis.
Vice-president—Bruce Haines, E. E. Souther Iron Co., St. Louis.
Secretary—L. F. Niemann, U. S. Steel Supply Co., St. Louis.
Treasurer—E. W. Fleer, Schurk Iron Works, Inc., St. Louis.
Chapter director—A. L. Petersen, Joseph T. Ryerson & Son, Inc., St. Louis.

Southern Chapter

President—L. H. Krieger, Jones & Laughlin Steel Corp., New Orleans.
Vice-president—J. Winship, Fulton Supply Co., Atlanta.
Secretary-treasurer—J. H. Arnold, Arnold Supply Co., Inc., Birmingham.
Chapter director—Frank Pidgeon, Pidgeon-Thomas Iron Co., Memphis.

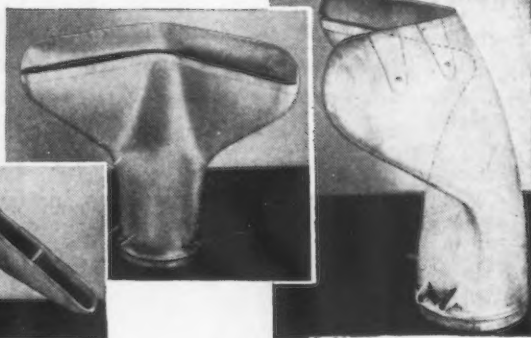
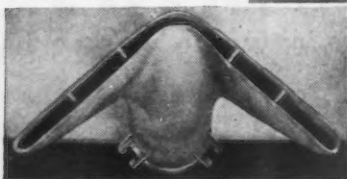
Texas Chapter

*President—R. L. Philips, Peden Iron & Steel Co., Houston.
*Vice-president—W. C. Jaschob, Briggs-Weaver Machinery Co., Dallas.
*Vice-president—J. H. Maxwell, Maxwell Steel Co., Fort Worth.
*Secretary—N. A. Fitch, National Steel Products Co., Houston.
*Treasurer—V. P. Williams, Markle Steel Co., Houston.
*Chapter director—R. L. Philips, Peden Iron & Steel Co., Houston.

Wisconsin Chapter

President—Carl Gallauer, United States Steel Supply Co., Milwaukee.
Vice-president—George Heiden, Shadbolt & Boyd Co., Milwaukee.
Secretary-treasurer—Reimar A. Frank, Gibbs Steel Co., Milwaukee.
Chapter director—George W. Smith, Joseph T. Ryerson & Son, Inc., Milwaukee.
*Re-elected to the same office.

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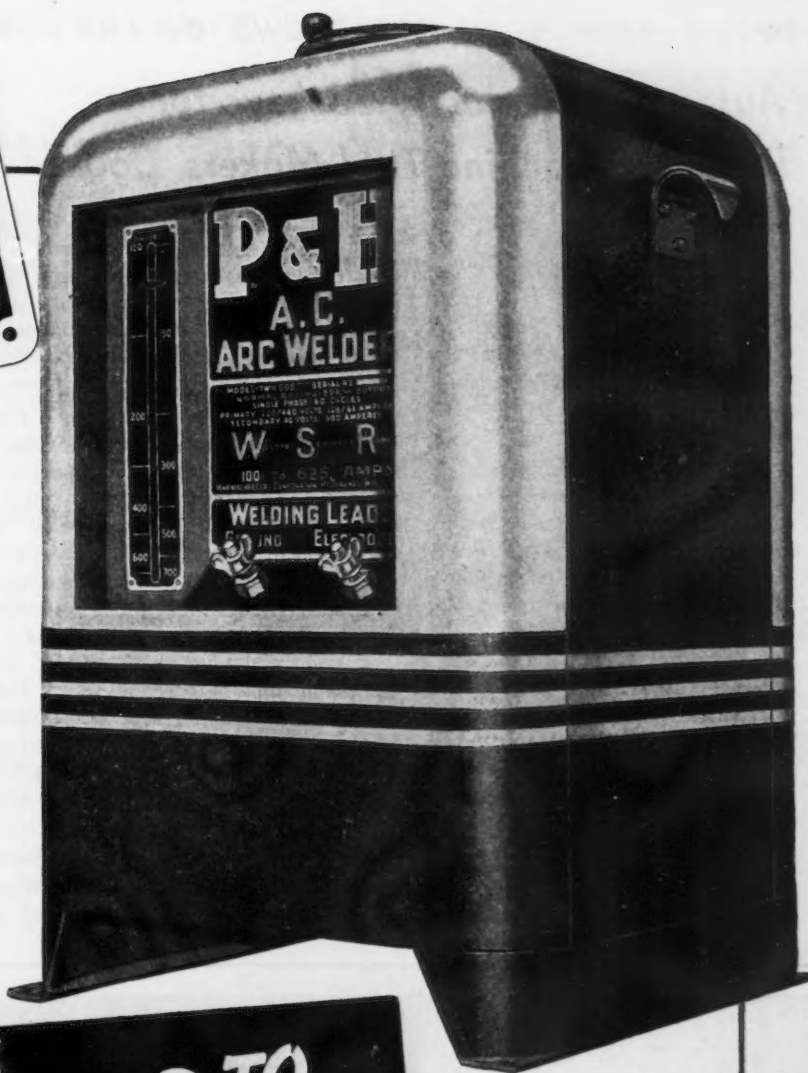
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Automotive Industry Jockeys for Place on Machine Tool Makers' Books

Chicago

••• Authority given automobile manufacturers to prepare plant drawings for resumption of automobile production has been the signal for a furious jockeying for position on the order books of machine tool builders in this section.

Vistas of an automobile production rate double that of immediate prewar years have been flashed before the eyes of the tool industry to such an extent that the average builder is too dazzled to know what to expect. The degree to which the automobile people will have to retool has been variously painted from 5 to 98 per cent. The latter prediction comes from one automobile maker gloomy over the dispersal of his former equipment, and cognizant that higher labor rates immediately will force far heavier reliance on high speed, automatic machinery.

Makers of special machinery inter-

pret advance inquiries to mean a far greater segment of the total automotive business will be theirs, and the old universal groan that sufficient standard tools have been made to last the country 15 years is heard less and less.

In their anxiety to win a place on the tool manufacturer's books, some automobile makers are reported shooting in orders without asking price quotations. The automobile people seem universally resigned to a higher price level, and one machine tool company reports receipt of an order, not preceded by inquiry, carrying a price exactly double that charged for the same tool before the war. The machine tool manufacturers, themselves, more generally envision a price level somewhere between one quarter and one third higher than prewar, however.

Despite harrowing experiences in the field of government controls, much industry opinion concedes that retool-

ing of the automotive industry will require some overall pattern governing the placement of orders. Unless this is done, it is pointed out, no one automobile builder is likely to secure tools necessary to rebuild his line completely from one end to the other, and the industry as a whole will be forced to wait a long while before any cars can be turned out.

Until present controls are lifted, all automotive orders must be placed "hold" files. It is likewise pointed out that if permission is given to accept such orders before the end of the war, OPA price controls will be obtained. Therefore, if some orders are held up until the OPA's demise there will be little crying by the machine tool industry.

Used Machine Tool Dealers To Discuss Postwar Problems

••• Proposals for the orderly redistribution of government-owned machine tools into postwar industry will be discussed at the second wartime conference, to be held at Hotel Pennsylvania, New York, June 5 and 6, by the Machinery Dealers' National Association.

This discussion will include comment and plans on the dissemination of information on export markets for machine tools, as well as the study of current problems of the machine tool market in general. Among the speakers scheduled to address the meeting are W. H. Myer, chief of machinery and motive products unit, U. S. Department of Commerce, and Major David Kriser, A.U.S., formerly with Industrial Plants Corp., and now serving with the Smaller War Plants Corp.

R. A. Vine, president of M.D.N.A. points out that since postwar industry's first needs are the machine tools of peacetime production, the used machine tool market will likely be the guinea pig test of any plan of government disposal. While not a "war baby," the industry has been galvanized into a cohesive national organization through its trade association, according to Mr. Vine. Statistics published by the association's research council, reveal that during 1942 the turnover in used and rebuilt machine tools by dealers amounted to an estimated 112,000 units valued at approximately \$140,000,000.



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A perfectly matched team—precision-grooved D-V Sheaves with full contact D-V Belts—give "Matched Quality" performance, negligible slippage loss and an even division of the load among fully seated, tightly gripping individual belts. D-V Drives are easy to install and maintain. Their smooth pick-up of the load and relatively low tension make them easy on the driving motor.

The Dodge Transmissioneer—your local Dodge Distributor—can furnish, usually out of stock, D-V Drives complete with belts and sheaves. He will gladly work with you to select "The Right Drive for Every Job".

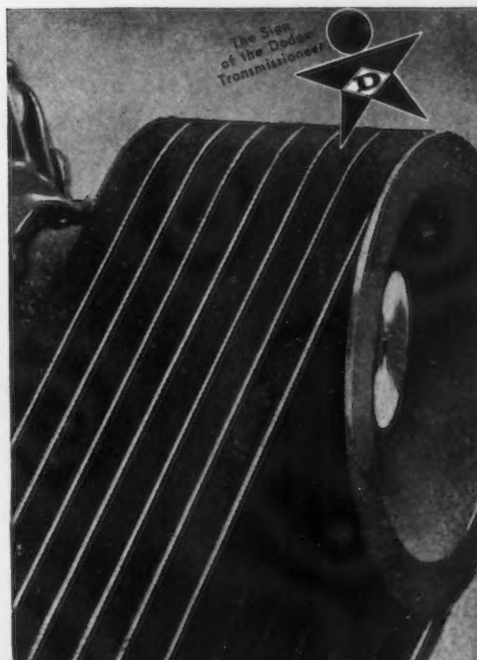
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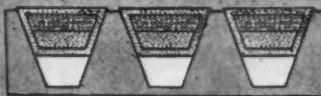
THE SIGN OF THE DODGE TRANSMISSIONEER

No. 6

... BUY MORE WAR BONDS



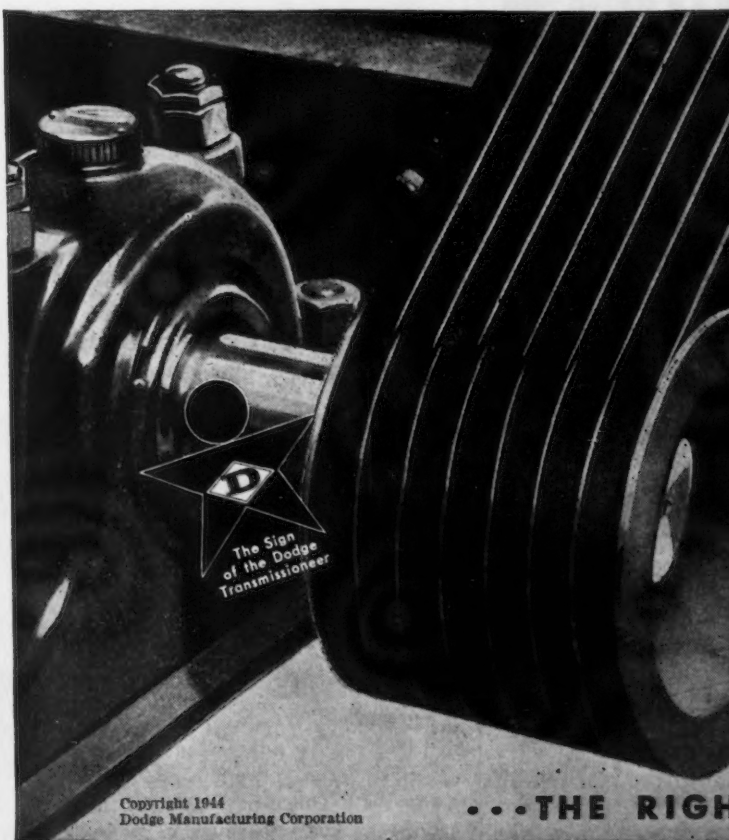
Dodge D-V Belts are Transmissioneered for maximum grip. Sidewalls are built concave to flatten out in flexing around the sheave and give full contact with sides of groove.



Dodge "Matched Quality" D-V Drives combine D-V precision-made sheaves and rugged D-V belts. This means uniform seating of belts—equalization of load—no loafing belts. Results in maximum power transmitted—longer belt life.



This is what happens when sheave grooves are not uniform. Belts do not seat properly—pull unevenly. This means reduced power transmitting capacity, uneven wear, and shortened life.



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Dodge Manufacturing Corporation

...THE RIGHT DRIVE FOR EVERY JOB

16:2—The Forgotten Stainless Steel

(CONTINUED FROM PAGE 70)

to produce satisfactory mechanical properties after proper tempering treatments. In the case of some forgings, it was found that a longer soaking period, at 1900 deg. F. or a preheat at 1300 deg. to 1400 deg. F. for 2 or 3 hr. was required in order to meet the mechanical property requirements of specification AN-QQ-S-770.

The chemical range for 16:2 under specification AN-QQ-S-770 is so broad that a variety of microstructures is produced. For example, if the chromium content is high and the nickel and carbon are low, the microstructures after heat treatment will consist of a high percentage of delta ferrite in a martensitic matrix. This material, because of the large amount of ferrite which doesn't respond to heat treatment, is quite frequently low in tensile yield and ultimate strength. Fig. 3a shows the microstructure of a heat of 16:2 stainless steel which fills the above conditions. It should

be noted that the ferritic phase is present not only in a high percentage but also as extremely large particles (due to the small amount of reduction from the original ingot).

In the case of low chromium and high carbon and nickel analysis, there is present in the microstructure only a small percentage of delta ferrite. Fig. 3b shows a photomicrograph of such a chemical combination. Note the very fine ferrite and that the ferrite constitutes only a small percentage of the cross-section. Due to the fact that only a small amount of the cross-section is non-heat treatable ferrite, this type of 16:2 will, upon proper heat treatment, harden to a tensile ultimate of approximately 200,000 lb. per sq. in. The impact strength will be satisfactory at the higher strengths; however, the machining of this alloy becomes more difficult as the strength exceeds 175,000 lb. per sq. in.

Fig. 3c is a photomicrograph of the transverse section of a $\frac{1}{2}$ x12 in. plate of 16:2 stainless. It should be noted that the ferrite in this plate material is lamellar and is oriented

such that the planes are parallel to the 12 in. dimension. The notch impact strength of this plate material is high when the notch is parallel to the planes of the lamellae, and is very low when the notch is at right angles to these planes.

In conclusion it can be said that 16:2 (Type 431) stainless steel, although known for many years, has only recently been used commercially in the United States. This alloy has a definite advantage over regular 18:8 stainless steel from a strength-weight ratio standpoint. This is most important in modern aircraft design, especially in the case of seaplanes.

Sudden Spurt in Orders Reported by Lathe Builders

Cincinnati

• • • Lathe manufacturers in the Cincinnati area report a sudden group of government orders for lathes as a result of change in war plans. As the result of this increase in new business, several lathe manufacturers indicate they are booked on full production for the remainder of this year. This, coupled with the recent lend-lease business that came into the market within the past two weeks, has increased the current backlog and brought the market to a brighter position than has been maintained during the first quarter of this year. In addition to these substantial bookings, manufacturers indicate a steady flow of other business, which has now made labor a very tough problem here. With the need for increased production in these various plants and the draft taking men rather rapidly, manufacturers are in a position where they are seeking additional labor.

Britton and Falck Appointed To WPB Machine Tool Posts

• • • Mason Britton, vice chairman of the board of directors of the McGraw-Hill Publishing Co., has been appointed as the United States member and chairman of the Machine Tools Committee of the Combined Production and Resources Board to succeed Ralph E. Flanders. Mr. Britton formerly was chief of OPM Tools Section. Mr. Flanders is president of the Jones & Lamson Machine Co., Springfield, Vt.

CPRB also announced that Edward Falck, recently appointed director of the WPB Office of War Utilities, has been named chairman of the CPRB Public Utilities to succeed J. A. Krug.

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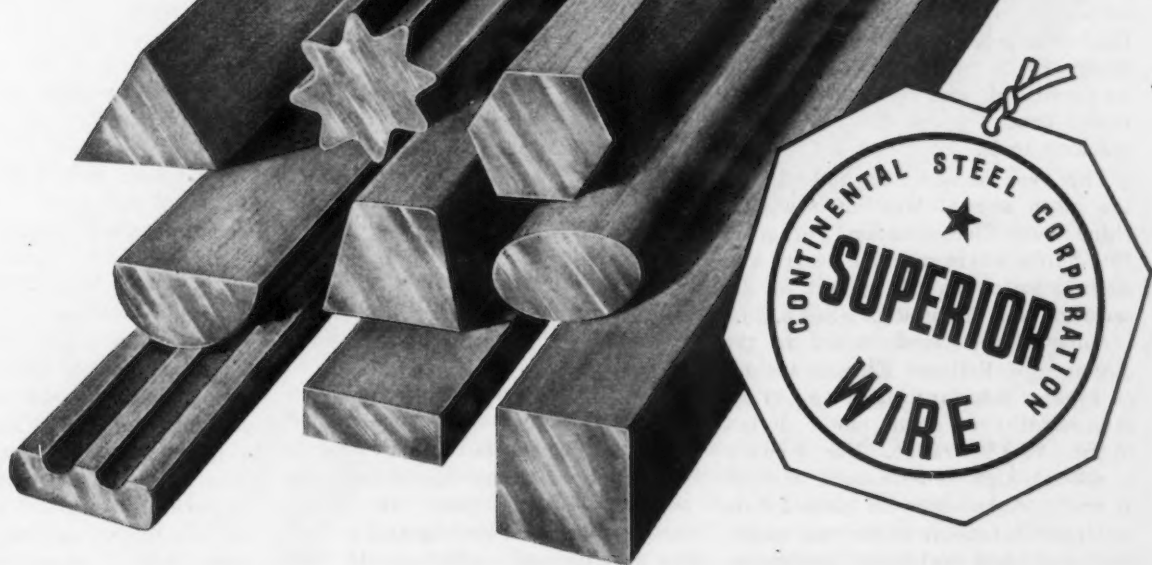


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MACHINE TOOLS

... News and Market Activities

Big Buyers Influence Design Trends

Cleveland

... Machine tool planning has experienced one of the most concerted efforts toward collective thinking during the last two weeks possibly in the history of the industry.

For the first time a major machine tool consumer called representatives of the industry together to project its needs and complaints. This was General Motors (THE IRON AGE, May 4, p. 78). Many guests from the GM meeting were then immediately entertained by the Reliance Electric & Engineering Co. of Cleveland which presented its postwar thinking so far as permissible and demonstrated electronic control at work in operating machine tools.

This was immediately followed by the ninth annual Westinghouse Machine Tool Electrification Forum in Pittsburgh where machine design and electrification ran the gamut of description and discussion. (See p. 78.)

Some of the trends noted in the planning of Reliance Electric included greater standardization and interchangeability of small motor design in the 1 to 3 hp. range. Use of either a special high temperature varnish of secret composition or glass fabric insulation is tending to decrease motor sizes and much higher continuous operating temperatures for motors also appear to be within attainment.

The Reliance V-S (motor-generator) variable speed power unit with and without electronic excitation was demonstrated as well as fully electronic power supply with full speed variability.

One of the most interesting general

discussions of new machine tool trends was given in a paper by E. L. Spray, manager of the Westinghouse Headquarters Manufacturing Division before the guests of the Westinghouse forum. Mr. Spray opened by admitting that he perceived a vast surplus of standard machine tools that he believed called for redesigning of new tools which would at once be advantageous to the operators and have the effect of obsoleting present standard tools thus causing a market incentive in the postwar period. To achieve this Mr. Spray recommended that new machine tool designing follow certain general aims.

First consideration would be to increase production per unit of labor expended in view of advanced labor costs. Specific operating characteristics he recommended included increased speeds and feeds, greater machine rigidity to permit rapid cutting of hard alloys, better bearings and more extensive use of heat treated parts.

Most important present functional ailment of many machine tools according to Mr. Spray is the high floor-to-floor time of many operations compared to cutting time. He recommended improved loading and unloading arrangements which would capitalize on the time saved by increased speeds and feeds. More convenient location of operators' controls, in line with General Motors' comments, were also suggested.

Mr. Spray stressed the opportunities of accurate and highly variable speed controls and stated that as little as 5 to 10 per cent in speed variation

may mean success or failure with some of the new cutting materials.

Multiple purpose machines which would automatically or semi-automatically perform a number of operations was seriously recommended. It was also held that such machines might well be adaptable to a number of sizes of work of a given design to improve the value of automaticity.

Draft Drains Endanger Stepped Up Production Plans

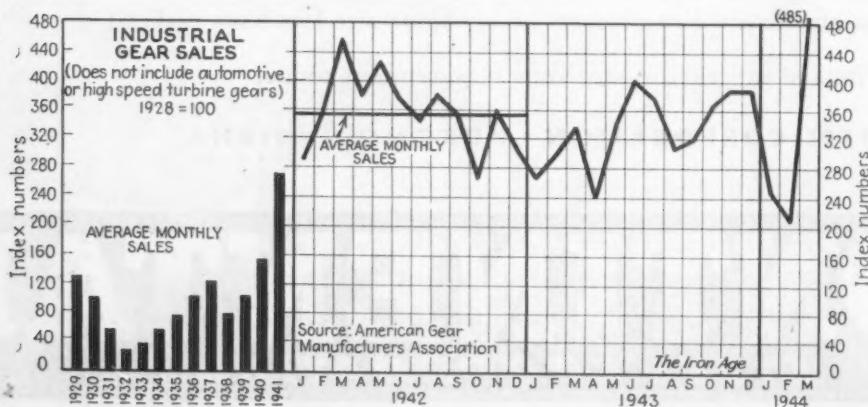
Rockford, Ill.

A freshet of orders springing from stepped up critical war programs plus a smattering of heavy lend-lease orders have rejuvenated the machine tool industry's outlook here in the past six weeks. Special machine producers have been garnering the bulk of the war orders, but the overflow to producers of standard models has been notable. One Russian order for planers will keep a local plant busy for eight months.

The B-29 super bomber and the Grumman Hellcat programs have been responsible for good orders from the aircraft industry. Recent increased emphasis on heavy artillery production has been reflected in a flood of inquiries and orders contributing to more extended backlogs. In one case, backlog has jumped from two to six months, chiefly because of business in the heavy aircraft category.

Nearly every manufacturer who has received orders involved in these critical programs voices the fear that delivery dates may not be met because of steady drain of workers by Selective Service, which has dug down deep into skilled categories. Lack of common labor or outright labor shortage also has been a limiting factor in some cases.

Gloom which pervaded the industry last fall and which was expressed in fears that the order pool would be dried up by mid 1944 has been replaced by a more temperate belief that business will continue at a high level throughout 1944 at least. Producers whose roots are deep in automobile industry business in normal times are looking forward to a business level, when the automobile program is released, on a par with that of 1940-41.



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NON-FERROUS METALS

... News and Market Activities

Copper Supply Grows Tighter

• • • Increased military requirements and increased draft demands on manpower have tightened the supply of copper and copper alloys. Increased use of brass for shell casings, of brass and bronze in shipbuilding and estimates of production declines are some of the major reasons behind this changed supply situation.

At a recent meeting of the Brass Mill Industry Advisory Committee of the WPB, the attending members pointed out that full cooperation of the industry will be required if production of brass alloy rods and tubing is to meet requirements.

March production of brass mills was the highest reached in 12 months with the exception of strip. New schedules for strip are expected to fall behind May output, and this lowered rate will in all probability be maintained through third quarter.

Copper Workers Ask Increases

• • • To open their drive against the Little Steel formula, the CIO unions of Connecticut will hold a mass meeting in Waterbury, Conn., on May 25.

CIO locals at the American Brass Co., Bristol Brass Corp., Chase Brass & Copper Co., Scovill Mfg. Co. and the U. S. Rubber Co. have requested wage increases above the fixed formula.

At the request of James Healey, vice-chairman of the New England Regional War Labor Board, representatives of the American Brass Co. and the Naugatuck Valley locals of the Mine, Mill and Smelter Workers will meet to discuss principal issues of the contract dispute which has been in negotiation since September. The union is asking for a wage increase of 17c. an hr., two weeks vacation for employees having three or more years of service, increased night shift differentials and union security and compulsory arbitration of grievances.

Restrictions Eased for Foundries

Because of the improved aluminum supply, the WPB has rescinded the order issued Feb. 19, 1942, instructing aluminum foundries to procure all their requirements of aluminum alloys from secondary smelters.

The secondary aluminum alloys which heretofore could not be supplied by primary aluminum producers are: Nos. 12, 112, 212, 113, 108, 81, 82, 83, 85 and 645.

Approval for Toll Charges Seen

• • • Ingot makers who process copper scrap or copper alloy scrap on toll, for the production of brass or bronze ingot or shot will be required to obtain approval of their charges from the OPA. This is one of three minor changes in the copper scrap and copper alloy scrap regulation that became effective April 29.

Such processing, performed under what are called toll or conversion contracts by the industry, were formerly covered by the General Maximum Price Regulation, which fixed the charge at the highest in effect during March, 1942. Requests for approval of these changes must now be made by letter addressed to the Non-Ferrous Metals Branch, Office of Price Administration, Washington 25.

OPA Defines Resale of Cu Scrap

• • • There appears to be some misapprehension with reference to the obligations of a consumer of copper scrap and copper alloy scrap who also, on occasion, re-sells such scrap. The question has been asked whether such scrap, when intended for re-sale,

may be purchased at a price higher than the maximum established for it, and whether it must be included in the reports submitted on form 120:7b.

Section 15 of Revised Maximum Price Regulation 20 defines as a consumer "any person whose business consists, in whole or in part, of smelting, refining, melting or otherwise processing copper scrap or copper alloy scrap into a form other than scrap. . . ." Any person who is a consumer, as defined above, is under the obligation not to pay any price higher than the maximum price established by the regulation, and to submit reports of his receipts of such scrap on form 120:7b. This obligation holds, irrespective of whether the scrap is used for the production of ingots, for re-sale, or for any other purpose.

New Limitation on Brass

Washington

• • • Beginning May 15, a new limitation will apply to deliveries of brass mill products from warehouse stocks, WPB announced last week. Under the new limitation, no person shall place orders that aggregate more than 500 lb. gross weight for delivery from warehouse stock of any item of brass mill product to any one destination during any calendar week.

This new limitation applies to all items of brass mill products except single continuous lengths of rod, tube, pipe, sheet and strip. Neither the new 500 lb. weekly limitation nor the former 2000 lb. monthly limitation, which is retained in the order, applies to condenser tubes or to resale of brass mill products obtained by a brass mill warehouse through an authorization issued by a regional office of WPB.

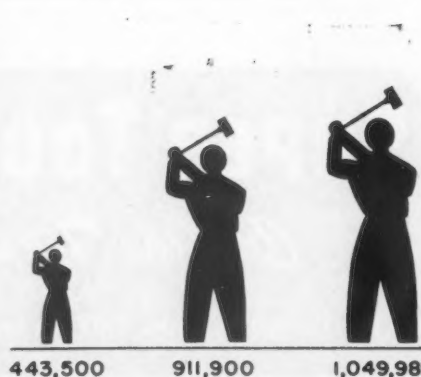
Milestones

• • • R. D. Cole Mfg. Co., Newnan, Ga., celebrated its 90th anniversary on May 7. The company has been awarded the Maritime Commission Award of Merit.

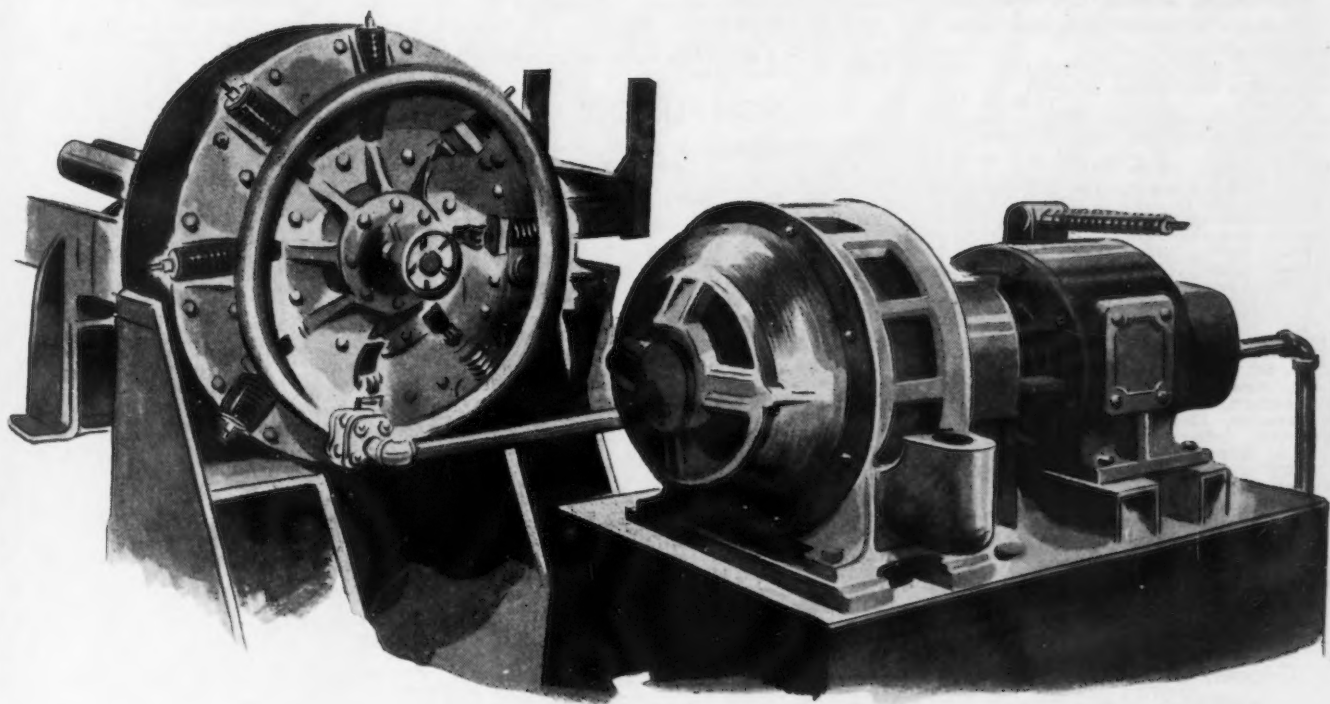
E. G. Cole is president and Byran Blackburn is treasurer of the company.

SHIPYARD EMPLOYEES BUILDING & REPAIRING U.S. NAVY VESSELS

JANUARY 1942	JANUARY 1943	JULY 1943
443,500	911,900	1,049,981



What a Handshake these fingers pack



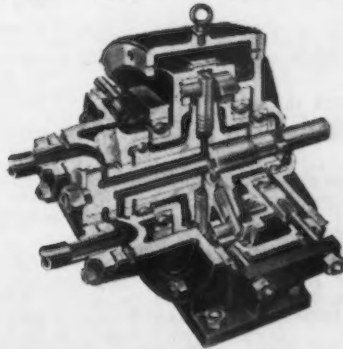
A story of a squeeze delivered by Hele-Shaw Fluid Power

BEFORE a tube is drawn through a die, the end is "pointed." Formerly it was simply bashed in by a process of hammering, a noisy operation that necessitated constant turning of the tube. Someone thought the job could be done better hydraulically. And did it.

Now, in a "squeeze pointer" a cluster of "fingers" crushes the end of the tube to a near point in one mighty squeeze. A throw of a lever . . . and wham! Just one quick stroke, that's all. The pressure of the Hele-Shaw

Fluid powered fingers is calculated so the end of the tube won't completely close—a neat example of pressure control.

Hele-Shaw Fluid Power does the job in seconds, saves time. Saves material because tube end wastage can be rigidly controlled. It's easier and quieter. Squeezing, lifting, tilting, pushing, pulling, and a variety of similar mechanical actions can often be improved by using Hele-Shaw Fluid Power. We're ready to work with you on future applications.



OTHER A-E-CO PRODUCTS:
TAYLOR STOKERS, MARINE DECK AUXILIARIES, LO-HED HOISTS

AMERICAN ENGINEERING COMPANY

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NON-FERROUS METALS

REFINER, SMELTER PRICES

(Cents per lb. unless otherwise noted)

Aluminum, 99+%, del'd	15.00
Aluminum, No. 12 Fdy., (No. 2)	12.00
Aluminum, deoxidizing grades	11.00 to 12.25
Antimony, Asiatic, New York	Nominal
Antimony, American, f.o.b. Laredo, Tex.	14.50
Arsenic, prime white, 99%	4.00
Brass, 85-5-5 ingots (No. 115)	13.00
Cadmium, del'd	90.00
Cobalt, 97-99% (dollars per lb.)	\$2.11
Copper, electro, Conn. Valley	12.00
Copper, electro, New York	11.75
Copper, lake	12.00
Copper, beryllium, 3.75-4.25% Be, dollars per lb. contained Be	\$15.00
Gold, U. S. Treas., dollars per oz.	\$35.00
Indium, 99.5%, dollars per troy oz.	\$7.50
Iridium, dollars per troy oz.	\$165.00
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9+%, carlots	20.50
Magnesium, 12-in. sticks, carlots	30.00
Mercury, dollars per 76-lb. flask, f.o.b. shipping point or port of entry	\$191 to \$193.00
Nickel, electro	35.00
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per oz.	\$35.00
Silver, open market, New York, cents per oz.	44.75
Tin, Straits, New York	52.00
Zinc, East St. Louis	3.25
Zinc, New York	8.67

Copper, Copper Base Alloys

(Mill base, cents per lb.)

	Extruded	Rods	Sheets
Copper	20.37	20.37	
Copper, H.R.	17.37		
Copper, drawn	18.37		
Low brass, 80%	20.40	20.15	
High brass	19.48		
Red brass, 85%	20.61	20.36	
Naval brass	20.37	19.12	24.50
Brass, free cut	15.01		
Commercial bronze, 90%	21.32	21.07	
Commercial bronze, 95%	21.53	21.28	
Manganese bronze	24.00	28.00	
Phos. bronze, A, B, 5%	36.50	36.25	
Muntz metal	20.12	18.87	22.75
Everdur, Herculey, Olympic or equal	25.50	26.00	
Nickel silver, 5%	28.75	26.50	
Architect bronze	19.12		

Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. (1/2 H); 52S, 61c. (O); 24S, 67 1/2 c. (T).

Plate: 0.250 in. and heavier; 2S and 3S, 21.2c.; 52S, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28 1/2 c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: 1/4 in., 28 1/2 c. per lb.; 1/2 in., 26c.; 1 in., 24 1/2 c.; 2 in., 23c. Hexagonals: 1/4 in., 34 1/2 c. per lb.; 1/2 in., 28 1/2 c.; 1 in., 25 1/2 c.; 2 in., 25 1/2 c. 2S, as fabricated, random or standard lengths, 1/4 in., 44c. per lb.; 1/2 in., 25c.; 1 in., 24c.; 2 in.,

23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27 1/2 c.

NON-FERROUS SCRAP METAL QUOTATIONS

(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums)

Copper, Copper Base Alloys

OPA Group 1

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	8.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

OPA Group 2

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.30*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids	8.50
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.25

OPA Group 3

Yellow brass soft sheet clippings	8.625
Yellow rod brass turnings	8.375
Zincy bronze borings	8.00
Zincy bronze solids	8.00
Fired rifle shells	8.25
Brass pipe	7.50
Old rolled brass	7.00
Admiralty condenser tubes	7.50
Muntz metal condenser tubes	7.00
Plated brass sheet, pipe reflectors	6.50
Manganese bronze solids	7.25 ¹
Manganese bronze solids	6.25 ¹
Manganese bronze borings	6.50 ¹
Manganese bronze borings	5.50 ¹

OPA Group 4

Automobile radiators	7.00
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OPA Group 5

Refinery brass	5.00*
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*Price varies with analysis. ¹Lead content 0.00 to 0.40 per cent. ²Lead content 0.41 to 1.00 per cent.

Other Copper Alloys

Briquetted Cartridge Brass Turnings	8.625
Cartridge Brass Turnings, Loose	7.875
Loose Yellow Brass Trimmings	7.875

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point)

Copper: Cast, elliptical, 15 in. and longer	25 1/4
Electrolytic, full size	22 1/2
cut to size	30 1/4
Rolled, oval, straight, 15 in. and longer	23 1/4
Curved	24 1/4
Brass: Cast, 82-20, elliptical, 15 in. and longer	23 1/4
Zinc: Cast, 99.99, 16 in. and over	16 1/4
Nickel: 99% plus, cast	47
Rolled, depolarized	48
Silver: Rolled, 999 fine per Troy (1-9) oz., per oz.	58

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

Aluminum

Plant scrap, segregated

All S-type alloys (except 2S)	8.50
2S solids	8.00
High grade alloys	7.00
Low grade alloys	6.50
Borings and turnings	
High grade alloys	5.50
Low grade alloys	5.00

Plant scrap, mixed

All solids	6.00
Borings and turnings	4.00

Obsolete scrap

Pure cable	8.00
Old sheet and utensils	7.00
Old castings and forgings	6.50
Pistons, free of struts	6.50
Pistons, with struts	4.50
Old alloy sheet	5.50

For old castings and forgings, pistons, sheets, add 1/4 c. lb. for lots 1000 to 19,999 lb.; for other scrap add 1c.; for lots over 19,999 lb. add 1 1/4 c. a lb.

Magnesium

Segregated plant scrap

Pure solids and all other solids, exempt	
Borings and turnings	8.00

Mixed, contaminated plant scrap

Grade 1 solids	11.00
Grade 1 borings and turnings	7.00
Grade 2 solids	9.00
Grade 2 borings and turnings	5.00

For lots over 1499 lb. add 1c. per lb.

Zinc

New zinc clippings, trimmings	7.25
Engravers', lithographers' plates	7.25
Old zinc scrap	5.75
Unsweated zinc dross	5.80
Die cast slab	5.80
New die cast scrap	4.95
Radiator grilles, old and new	4.95
Old die cast scrap	4.50

Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead inc. cable, for f.o.b. point of shipment price.

Nickel

Ni content 93-95%, Cu under 1/2%, 26c. per lb.; 99 to 98% Ni, 26c. per lb. contained Ni.

Chemicals

(Cents per lb., delivery from New York)

Copper cyanide, tech., 100-lb. bbls. 1-5	5.65
Copper sulphate, 99.5 crystals, bbls.	13.00-13.50
Nickel salts, single, 425-lb. bbls.	34.00
Silver cyanide, 100 oz., lots 40.82-41.125	
Sodium cyanide, 96% dom., 100-lb. dms.	0.15
Zinc cyanide, 100-lb. dms.	33.00
Zinc sulphate, 89% crystals, bbls.	6.80

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*Built to give
you more*

P.L.H.
POUND LIFTING HOURS

FEATURES:

Coil Locked in Place — to prevent damage and short circuiting.

Coil Waterproofed — impregnated under pressure.

Large Structural Fins — impart added strength and radiate heat.

Leads Fully Protected.

Heavy Bottom Plate Stands Rough Handling.

Special Steels and Highest Quality Construction.

THE power, ruggedness and balanced design of every DING'S High Intensity Magnet is the result of over forty years of building magnetic equipment exclusively. The entire Dings organization is devoted to building better magnets and the engineering department is concerned only with magnetic design and operation. These years of research, testing and design have produced the DINGS High Intensity Lifting Magnet, a machine in which the balance of copper wire and steel is correctly proportioned to obtain maximum lifting capacity with a minimum of weight and current input.

A complete line of High Intensity Circular and Rectangular lifting magnets, to meet every requirement, is offered to those with metal handling problems.

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Dings
MAGNETIC
SEPARATION *HIGH
INTENSITY*

MAGNETIC HEADQUARTERS SINCE 1899

WORLD'S LARGEST EXCLUSIVE BUILDERS OF MAGNETIC EQUIPMENT

Ceilings on Imported Scrap Not Expected to Increase Foreign Scrap Trade

New York

•••The dollar and cents ceiling prices as established recently by OPA on imported scrap will have no price effect on this material. Heretofore, very little private scrap came into the country because of the high freight rates, and the Metals Reserve Corp. handled all scrap imports. MRC sales were made with the advice of WPB and OPA. The new regulation in effect froze the methods for government sales and eliminates many approvals that were needed by MRC for such sales.

The second effect of the new ceiling price schedule for imported scrap was that it creates a formula for private importation if and when freight rates are very substantially reduced. This of course cannot occur before the end of the war. From this standpoint, it would seem that preparations are being made for continued price control after the war is finished.

The imported scrap that has come in through private dealers since the war started has been negligible, for two reasons. First, mills couldn't pay mill based prices with the high shipping costs from remote foreign producing areas. Second, the red tape involved in such imports scared dealers off. Now, with the price of imported scrap based on the port of entry ceiling price, dealers will be prohibited from bringing it in because they would have to absorb shipping costs to such ports of entry.

Battlefield scrap will be entirely unaffected by the new ruling since it is all government owned and sold mainly on a bid basis. These bids naturally must conform to ceiling prices on scrap if the material sought is for direct mill shipment. The bid system will continue and is in no way influenced by the import ceilings. As to battlefield scrap, there has been a marked drop in the volume coming into New York during the past few weeks. However, other ports report no such declines.

Manpower is still the biggest problem of the yard operator. In the East, and at other points as well, the scrap yard wage schedule is substantially below other industries such as

shipbuilding, and the manpower from the yards is still draining off to these fields. As one yard operator put it, "Our yard looks like it is being run with a skeleton force." The larger yards with better machinery and equipment have an advantage from this standpoint because more of the work can be handled with fewer men than in yards where the work is done manually.

Reports from various points indicate that consumers are having difficulty with brass inclusions in turnings shipments. Some observers point out that there is no more brass in the shipments than normally, but with the turnings situation so bad at present, mills are finding more to complain about.

PITTSBURGH — Practically all consumers are in the market for open hearth grades, with brokers and dealers easily disposing of anything they can get their hands on. Short turnings are becoming scarcer here, apparently due to demand picking up elsewhere, thus preventing some shipments into this district. Machine shop turnings seem to be balanced, but interest in nickel turnings is zero. There are no tight supply spots as yet.

CHICAGO—Dissatisfaction reported on the Pacific Coast over shipments of shipyard scrap to this territory is not reflected here. Mills, brokers and dealers all appear satisfied that there is a real need for the Coast material and that shipments from within the Chicago territory are not affected. Because West Coast mills protested the sales here at \$2.69 below ceiling, f.o.b. cars West Coast, this discount has been discontinued. Because with much of this material no further preparation is necessary before charging, this higher price does not work to a disadvantage to local mills which would have to pay preparation charges on locally produced scrap. Discounts continue on blast furnace grades and machine shop turnings.

BUFFALO—The scrap situation in the Buffalo district has become somewhat brighter with all mills buying on a moderate scale and dealers reporting a fair movement of most items, except turnings. A prominent consumer has received a moderate supply of cast iron borings after having orders out for two months. Two more boatloads of heavy melting are reported enroute from the Midwest, making four so far this season. These shipments are for the district's leading consumer, whose reserves now are becoming satisfactory.

BOSTON—While some mills still refuse to pay more than \$9.06 for turnings, others are taking short turnings at \$12.05, Boston, and \$11.06, outside Boston. Low phos plate scrap was moved to electric furnaces the past week, and cast iron to steel foundries, but, as heretofore, there is no snap to business. First hands having scrap bars, angles and the like refuse to sell because they cannot get new ones.

NEW YORK—The turnings market has developed into a first class headache. Mills have been further cutting down already reduced purchases of this material. Some turnings are moving and dealers have been able to hold pretty close to ceiling. However, there are indications of present buyers going out of the turnings market and a break can occur at any time. When present customers stop buying dealers will have to meet cut price offers to get rid of material.

PHILADELPHIA—There has been little change in the scrap picture here. Turnings, however, are getting more difficult to dispose of and several mills have stopped incoming shipments. Consumers not on basing points are refusing to pay full springboard prices on open hearth grades, but there has been no decline in the movement of these grades.

CLEVELAND — Open hearth scrap movement has slowed somewhat here but demand is still strong. Blast furnace grades likewise continue in good demand. Out of city demands remain good especially to Pittsburgh, but Valley shipments are off as are shipments to Canton-Massillon area. Alloys are difficult to dispose of at practically any price.

CINCINNATI—Foundries are in the market strongly for good rail and cast scrap, but there is not enough to take care of them. Some mills are also in the market continually for high grade carbon steel, as all consumers tend to greater insistence upon good specifications. Alloy steel is being shunned wherever possible, but under force of necessity, some is being accepted. One mill, which has been rumored will be out of production after the first of June, is out of the market in the purchase of scrap and is reported to have offered some of its scrap material for sale.

BIRMINGHAM — Although tonnages being offered are limited, there seems to be an increased demand in this district for cast grades. On the manpower side, a labor shortage at dealers' yards appears to be growing more serious.

ST. LOUIS—Floods on the Mississippi, Missouri and Illinois Rivers and tributaries continue to retard the movement of scrap iron to the St. Louis industrial district and to delay its processing. Some dealers' yards are affected by too much water and too few laborers.

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Key

to BETTER
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mit a reduced inventory of lubricants highly efficient for turret lathes, automatics, broachers, shapers, grinders and machine tools generally.

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IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

(All Prices Are Per Gross Ton)

ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES

(All Prices Are Per Gross Ton)																	
	BASIC OPEN HEARTH GRADES		BLAST FURNACE GRADES				Low Phos.		Heavy Structural and Plate			Foundry Steel					
	No. 1 & 2 Hvy. Melt. No. 1 Cp. Blk. Shrs. No. 1 & 2 Bundles No. 1 Busheling	Unbaled* Machine Shop Turnings	Mixed Borings and Turnings	Cast Iron Borings	Shovelling Turnings	No. 2 Busheling	Bar Crops, Punchings Plate Scrap and Cast Steel	3 ft. and Under	2 ft. and Under	1 ft. and Under	2 ft. and Under	1 ft. and Under	Auto. Springs, and Crank-shafts	Alloy Free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles	
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton, Cleveland, Middletown, Cincinnati, Portsmouth, Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Point, Ashland, Ky., Buffalo, N. Y., Bethlehem, Pa.; Kokomo, Ind., Duluth, Minn., Detroit, Mich., Toledo, Ohio, St. Louis, Mo., Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles, Pittsburg, Cal; San Francisco, Minnequa, Colo., Seattle, Wash.	\$20.00 19.50 18.75 19.50 19.25 18.25 18.00 17.85 17.50 17.00 16.50 14.50	\$15.00 14.50 13.75 14.50 14.25 13.25 13.00 12.85 12.50 12.00 11.50 9.50	\$15.00 14.50 13.75 14.50 14.25 13.25 13.00 12.85 12.50 12.00 11.50 9.50	\$16.00 15.50 14.75 15.50 15.25 14.25 14.00 13.85 13.50 13.00 12.50 10.50	\$17.00 16.50 15.75 16.50 16.25 15.75 15.50 14.85 14.50 14.00 13.50 11.50	\$17.50 17.00 16.25 17.00 16.75 15.75 15.50 15.35 15.00 14.50 14.00 12.00	\$25.00 24.50 23.75 24.50 24.25 23.25 23.00 22.85 22.50 22.00 21.50 19.50	\$22.50 22.00 21.25 22.00 21.75 20.75 20.50 20.35 20.00 19.50 19.00 17.00	\$21.50 21.00 20.25 21.00 20.75 19.75 19.50 19.35 19.00 18.50 18.00 16.00	\$22.50 22.00 21.25 22.00 21.75 20.75 20.50 20.35 20.00 19.50 19.00 17.00	\$21.50 21.00 20.25 21.00 20.75 19.75 19.50 19.35 19.00 18.50 18.00 16.00	\$22.00 21.50 20.75 21.50 21.25 20.75 20.50 20.35 20.00 19.50 19.00 17.00	\$21.00 20.50 19.75 20.50 20.25 19.25 19.00 18.85 18.50 18.00 17.50 15.50	\$18.00 17.50 16.75 17.50 17.25 16.25 16.00 15.85 15.50 15.00 14.50 12.50	\$19.50 19.00 18.25 19.00 18.75 17.75 17.50 17.35 17.00 16.50 16.00 14.00	\$21.00 20.50 19.75 20.50 20.25 19.25 19.00 18.85 18.50 18.00 17.50 15.50	

* Baled turnings are \$5 per gross ton higher.

BUNDLES: Tin can bundles are \$4 below dealers' No. 2 bundles; No. 3 bundles are \$2 less than No. 1 heavy melting.

AT NEW YORK CITY or Brooklyn, the maximum shipping point price is \$16.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on trucks. Minimum set at \$14 per gross ton at any shipping point in U. S. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is \$15.95 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of \$6.66 per ton.

SWITCHING CHARGES: Deductions for shipping points within basing point (cents per gross ton) are: Chicago, 84c.; Pittsburgh, Brackenridge, 55c.; Detroit, 53c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, Pittsburg, 42c.; Seattle, 38c.; Buffalo, Claymont, Harrisburg, 86c.; Atlanta, Birmingham, 32c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Phoenixville, Bethlehem, Kokomo, Duluth and St. Louis, 28c.; Alabama City, Ala., 26c.; Minnequa, Colo., 22c.; Middletown, 14c.; Conshohocken, Sparrows Point, 11c.

* Basic open hearth and foundry grades, and auto springs and crank-shafts, deduct 80c. per ton.

BASING POINT includes switching districts of city named.

Basing point	Switching districts:
Pittsburgh	Bessemer, Homestead, Duquesne, Munhall, McKeesport
Cincinnati	Newport
St. Louis	Granite City, E. St. Louis, Madison, Ill.
Chicago	Gary
Claymont	Chester, Pa.
San Francisco	So. San Francisco, Niles, Oakland

MAXIMUM SHIPPING POINT PRICE: Where shipment is wholly or partially by rail or vessel, or combination of rail and vessel, the scrap is at shipping point when placed f.o.b. railroad or f.a.s. vessel.

For motor vehicle shipments scrap is at shipping point when loaded. Then maximum shipping point price shall be: (a) For shipping point located within a basing point, prices shown in above table for scrap at basing point in which shipping point is located, minus applicable switching charge deduction shown in paragraph above labeled "Switching Charges." (b) For shipping points outside basing point, price listed in above table hereof for scrap at most favorable basing point, minus lowest charge for transportation from shipping point to such basing point by rail or water carrier or combination. Where vessel movement is involved, in lieu of established dock charge or any cost customarily incurred at the dock, 75c. per ton must be included as part of deduction in computing shipping point price; 80c. at Memphis; \$1 at Great Lakes ports; and \$1.25 at New England ports. If no established transportation rate exists for a portion of movement from shipping to basing point, actual charge or cost customarily incurred by shipper in such portion of movement shall be included as part of deduction in computing shipping point price. For exceptions see official order.

UNPREPARED SCRAP: For unprepared scrap, maximum prices shall be \$3.50 (and in the case of the material from which No. 1, No. 2, and No. 3 bundles are made \$4) less than maximum prices for the corresponding prepared scrap. In no case, however, shall electric furnace, acid open hearth and foundry grades be used as the corresponding prepared scrap. A preparation-in-transit charge for unprepared scrap is provided.

NEW LISTED GRADES: Priced in dollars per gross ton less than No. 1 heavy melting steel. Pit scrap, ladle skulls, slag reclaim, etc., of 85% or more Fe priced less \$2; 75 to 85% Fe less \$4; under 75% Fe less \$8 per ton. Mill scale less \$8 per ton. Mill cinder and grindings, shipping point maximum price of \$4 per gross ton at all U. S. shipping points.

CHEMICAL BORINGS: No. 1 (new, clean, containing not more than 1% oil), \$1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5% oil), \$2 less than No. 1 heavy melting. If loaded in box cars add 75c. mill scale, \$8 less than No. 1 heavy melting.

Tool Steel Scrap Prices (MPR 379)

SEGREGATED			UNSEGREGATED SOLIDS		UNSEGREGATED TURNINGS	
Type	12% min. W, 1% max. Mo.	Solids Per Lb. Cont. W	Turnings Per Lb. Cont. W	\$1.50 per lb. contained W if 5% or more.	\$1.30 per lb. contained W if 5% or more.	
Type 2	5 to 12% W, 1% max. Mo.	\$1.80	\$1.60	\$1.15 per lb. contained W if 1 to 5%.	\$1.00 per lb. contained W if 1 to 5%.	
Type 3	1 to 5% W, 1.5% max. Mo.	1.60	1.40	\$0.80 per lb. contained Mo if 1.5% or more.	\$0.70 per lb. contained Mo if 1.5% or more.	
*Type 4	7% min. Mo, 2% max. W.	0.125	0.105	If both W and Mo are within ranges, payment may be for both W and Mo content.		
*Type 5	3.5 to 6% Mo, 4.5 to 6% W.	0.135	0.115			

*Per lb. of scrap material.

If segregated, a premium of \$1.50 per lb. of contained Co allowed if Co content is 3% or over. No scrap considered segregated if Co content ranges between 0.5 and 3%.

If Cu or Ni content over 0.25%, price shall be reduced by 50%.

If 500 lb. or less is sold, either segregated or unsegregated, price shall be reduced 2c. per lb. of scrap material.

Cast Iron Scrap

Maximum on-line price, per gross ton, for any of the following cast grades will be the price shown at the highest priced zone in which the railroad operates or is located.

	Per Gross Ton		
	Zone A	Zone B	Zone C
Cast Iron, No. 1	\$18.00	\$19.00	\$20.00
Cast Iron, No. 2	17.00	18.00	19.00
Cast Iron, No. 3	14.50	15.50	16.50
Cast Iron, No. 4	13.25	14.25	15.25
Cast Iron Brake Shoes	13.25	14.25	15.25
Malleable	20.00	21.00	22.00
Wheels, No. 1	18.00	19.00	20.00

Zone A includes Mont., Idaho, Wyo., Nev., Utah, Ariz., and N. M. Zone B includes N. D., S. D., Neb., Colo., Kan., Okla., Texas, and Fla. Zone C includes all states not named in zones A and B, and includes switching district of Kansas City, Kansas-Missouri.

For cast, an in-transit preparation fee will be applicable only for preparing Cast iron No. 3 into Cast Iron No. 1, for which the maximum preparation fee shall be \$3.50 per gross ton. (Previous dealer fee was \$2.50.)

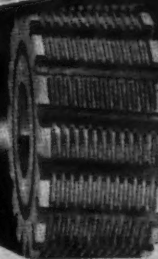
CAST IRON GRADE DEFINITIONS: Cast Iron No. 1—Cast iron scrap such as columns, pipe, plates and/or castings of miscellaneous nature, but free from stove plate, brake shoes, and/or burnt scrap. Must be cupola size not over 24 x 30 in. and no pieces to weigh more than 150 lb. Free of foreign material. No. 2—Cast iron scrap in pieces weighing over 150 lb. not more than 500 lb. and free from burnt cast. No. 3—Cast iron scrap in pieces over 500 lb., includes cylinders, driving wheel centers, and/or all other castings. Free from hammer blocks or bases. No. 4—Burnt cast iron scrap such as grate bars, stove parts, and/or miscellaneous burnt scrap. No. 5—Driving and/or car brake shoes of all types except composition filled. Malleable—Malleable parts of automobiles, railroad cars, and locomotives. No. 7—Wheels, No. 1, includes cast iron car and/or locomotive wheels.

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Comparison of Prices . . .

Advances Over Past Week in Heavy Type; Declines in *Italics*.

[Prices Are F.O.B. Major Basing Points]

Flat Rolled Steel: (Cents Per Lb.)	May 9, 1944	May 2, 1944	April 4, 1944	May 11, 1943
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

Tin and Terne Plate: (Dollars Per Base Box)	May 9, 1944	May 2, 1944	April 4, 1944	May 11, 1943
Tin plate, standard cokes	\$5.00	\$5.00	\$5.00	\$5.00
Tin plate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30

Bars and Shapes: (Cents Per Lb.)	May 9, 1944	May 2, 1944	April 4, 1944	May 11, 1943
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40

Wire and Wire Products: (Cents Per Lb.)	May 9, 1944	May 2, 1944	April 4, 1944	May 11, 1943
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55

Rails: (Dollars Per Gross Ton)	May 9, 1944	May 2, 1944	April 4, 1944	May 11, 1943
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00
Light rails	40.00	40.00	40.00	40.00

Semi-Finished Steel: (Dollars Per Gross Ton)	May 9, 1944	May 2, 1944	April 4, 1944	May 11, 1943
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs, rerolling	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00

Wire Rods and Skelp: (Cents Per Lb.)	May 9, 1944	May 2, 1944	April 4, 1944	May 11, 1943
Wire rods	2.00	2.00	2.00	2.00
Skelp	1.90	1.90	1.90	1.90

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 173-179.

Pig Iron: (Per Gross Ton)	May 9, 1944	May 2, 1944	April 4, 1944	May 11, 1943
No. 2 fdy., Philadelphia	\$25.84	\$25.84	\$25.84	\$25.89
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	25.11	25.11	25.11	24.68
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa	25.34	25.34	25.34	25.39
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	37.34	37.34	37.34	31.34
Ferromanganese†	135.00	135.00	135.00	135.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)	May 9, 1944	May 2, 1944	April 4, 1944	May 11, 1943
Heavy melt'g steel, P'gh	\$20.00	\$20.00	\$20.00	\$20.00
Heavy melt'g steel, Phila	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Ch'go	20.00	20.00	20.00	20.00

Coke, Connellsville: (Per Net Ton at Oven)	May 9, 1944	May 2, 1944	April 4, 1944	May 11, 1943
Furnace coke, prompt	\$7.00	\$7.00	\$7.00	\$6.50
Foundry coke, prompt	8.25	8.25	8.25	7.375

Non-Ferrous Metals: (Cents per Lb. to Large Buyers)	May 9, 1944	May 2, 1944	April 4, 1944	May 11, 1943
Copper, electro., Conn	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

Composite Prices . . .

Starting with the issue of April 22, 1943, the weighted finished steel price index was revised for the years 1941, 1942 and 1943. See explanation of the change on page 90 of the April 22, 1943, issue.

FINISHED STEEL				PIG IRON		SCRAP STEEL	
				HIGH	LOW	HIGH	LOW
May 9, 1944	2.25513c.	a Lb.	23.61	a Gross Ton	19.17	a Gross Ton	19.17
One week ago	2.25513c.	a Lb.	23.61	a Gross Ton	19.17	a Gross Ton	19.17
One month ago	2.25513c.	a Lb.	23.61	a Gross Ton	19.17	a Gross Ton	19.17
One year ago	2.26190c.	a Lb.	23.61	a Gross Ton	19.17	a Gross Ton	19.17
1943	2.25513c.		23.61		19.17		19.17
1942	2.26190c.		23.61		19.17		19.17
1941	2.43078c.		23.61		19.17		19.17
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.61, Mar. 20	23.45, Jan. 2	22.00, Jan. 7	19.17, Apr. 10	19.17, Apr. 10
1939	2.35367c., Jan. 3	2.26689c., May 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9	16.04, Apr. 9
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16	14.08, May 16
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7	11.00, June 7
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.67, June 8	12.67, June 8
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9	12.67, June 9
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29	10.33, Apr. 29
1933	1.95578c., Oct. 3	1.75836c., May 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25	9.50, Sept. 25
1932	1.89196c., July 5	1.83901c., Mar. 1	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3	6.75, Jan. 3
1931	1.99626c., Jan. 13	1.86586c., Dec. 29	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5	6.43, July 5
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29	8.50, Dec. 29
1929	2.31773c., May 28	2.26498c., Oct. 29	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9	11.25, Dec. 9
			18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3	14.08, Dec. 3

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 73 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. Extras apply. Delivered prices do not reflect 3% tax on freight. (1) Mill run sheet, 10c. per lb. under base; primes 25c. above base. (2) Unassorted 8-lb. coating. (3) Widths up to 12-in. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25c. per 100 lb. to fabricators. (8) Also shafting. For quantities of 20,000 to 29,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (12) Boxed. (13) Portland and Seattle price, San Francisco 2.50c. (14) This base price to be used in figuring annealed, bright finish wires, commercial spring wire.

Basing Point ↓ Product													DELIVERED TO		
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	¹⁰ Pacific Ports, Cars	Detroit	New York	Phila- delphia
Hot Rolled Sheets	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold Rolled Sheets ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized Sheets (24 gage)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling Sheets (20 gage)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢
Long Ternes ²	3.80¢	3.80¢	3.80¢									4.55¢		4.16¢	4.12¢
Hot Rolled Strip ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold Rolled Strip ⁴	2.80¢	2.90¢		2.80¢			2.80¢		(Worcester = 3.00¢)				2.90¢	3.16¢	
Cooperage Stock Strip	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R Strip	2.95¢	3.05¢		2.95¢			2.95¢		(Worcester = 3.35¢)				3.05¢	3.31¢	
Coke Tin Plate, Base Box	\$5.00	\$5.00	\$5.00						\$5.10					5.36¢	5.32¢
.50 } Electro Tin Plate, Box .75 }	\$4.50	\$4.50	\$4.50						\$4.60						
	\$4.65		\$4.65						\$4.75						
Black Plate (29 gage) ⁵	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ ¹²			3.37¢
Mfg. Ternes, Special Box	\$4.30	\$4.30	\$4.30						\$4.40						
Carbon Steel Bars	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			(Duluth = 2.25¢)		2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail Steel Bars ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (Billet) Bars ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢ ¹³	2.25¢	2.39¢	
Reinforcing (Rail) Bars ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢ ¹³	2.25¢		2.47¢
Cold Finished Bars ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)	(Toledo = 2.80¢)			2.99¢	2.97¢	
Alloy Bars, Hot Rolled	2.70¢	2.70¢				2.70¢			(Bethlehem, Massillon, Canton = 2.70¢)				2.80¢		
Alloy Bars, Cold Drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
Carbon Steel Plates	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.35¢		2.45¢	2.65¢	2.32¢	2.29¢	2.15¢
Floor Plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	3.67¢
Alloy Plates	3.50¢	3.50¢							(Coatesville = 3.50¢)		3.95¢	4.15¢		3.70¢	3.50¢
Structural Shapes	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢			(Bethlehem = 2.10¢)		2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢					(Worcester = 3.00¢)						
0.51 to 0.75 Carbon	4.30¢			4.30¢					(Worcester = 4.50¢)						
0.76 to 1.00 Carbon	6.15¢			6.15¢					(Worcester = 6.35¢)						
1.01 to 1.25 Carbon	8.35¢			8.35¢					(Worcester = 8.55¢)						
Bright Wire ¹⁴	2.60¢	2.60¢		2.60¢	2.60¢				(Worcester = 2.70¢)	(Duluth = 2.65¢)	3.10¢				2.92¢
Galvanized Wire															
Spring (High Carbon)	3.20¢	3.20¢		3.20¢					(Worcester = 3.30¢)			3.70¢			3.52¢
Steel Sheet Piling	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢

EXCEPTIONS TO PRICE SCHED. NO. 6

Slabs—Andrews Steel Co. \$41 basing pts.; Wheeling Steel Corp. \$34 Portsmouth, Ohio; Empire Sheet & Tin Plate Corp. \$41; Phoenix Iron Co. (rerolling) \$41, (forging) \$47; Granite City Steel Co. \$47.50.
Blooms—Phoenix Iron Co. (rerolling) \$41, (forging) \$47.
Sheet Bar—Empire Sheet & Tin Plate Co. \$39 mill; Wheeling Steel Corp. \$38 Portsmouth, Ohio.
Billets, Forging—Andrews Steel Co. \$50 basing pts.; Follansbee Steel Corp. \$49.50 Toronto; Phoenix Iron Co. \$47.00 mill.
Billets, Rerolling—Continental Steel Corp. may charge Acme Steel in Chicago switching area \$34 plus freight from Kokomo, Ind.; Northwestern Steel & Wire Co. (Lend-Lease) \$41 mill; Wheeling Steel Corp. (small) \$36 Portsmouth, Ohio; (blooming mill sizes) applicable base, f.o.b. Portsmouth, Ohio; Stanley Works may sell Washburn Wire Co. under allocation at \$39 Bridgeport, Conn.; Keystone Steel & Wire Co. may sell Acme Steel Co. at Chicago base, f.o.b. Peoria; Phoenix Iron Co. \$41 mill; Continental Steel Corp. (1½ x 1½) \$39.50, (2 x 2) \$40.60 Kokomo, Ind. (these prices include \$1 size extra); Keystone Steel & Wire Co. \$36.40 Peoria; Connors Steel Co. \$50.69 Birmingham; Ford Motor Co. \$34 Dearborn, Mich.
Structural Shapes—Phoenix Iron Co. \$2.35 basing pts., (export) \$2.50 Phoenixville; Knoxville Iron Co. \$2.30 basing pts.

Bar Size Shapes—(Angles) W. Ames & Co., 10 tons or over, \$3.10 mill.
Rails—Sweet Steel Co. (rail steel) \$50 mill; West Virginia Rail Co. (lightweight) on allocation based Huntington, W. Va.; Colorado Fuel & Iron Corp. \$45 Pueblo.

Hot Rolled Plate—Granite City Steel Co. \$2.65 mill; Knoxville Iron Co. \$2.25 basing pts.; Kaiser Co. \$3.20 Pacific Ports; Central Iron & Steel Co. \$2.50 basing points; Granite City Steel Co. \$2.35 Granite City.

Merchant Bars—W. Ames & Co., 10 tons and over, \$2.85 mill; Eckels-Nye Steel Corp., \$2.50 basing pts. (rail steel) \$2.40; Phoenix Iron Co. \$2.40 basing pts.; Sweet Steel Co. (rail steel) \$2.35 mill; Joslyn Mfg. & Supply Co. \$2.35 Chicago; Calumet Steel Div., Borg Warner Corp. (8 in. mill bars) \$2.35 Chicago; Knoxville Iron Co. \$2.30 basing pts. Laclede Steel Co., sales to LaSalle Steel granted Chicago base, f.o.b. Madison, Ill.

Reinforcing Bars—W. Ames & Co., 10 tons and over, \$2.35 mill; Sweet Steel Co. (rail steel) \$2.35 mill; Columbia Steel Co. \$2.50 Pacific Ports.

Cold Finished Bars—Keystone Drawn Steel Co. on allocation, Pittsburgh c.f. base plus c/l freight on hot rolled bars Pittsburgh to Spring City, Pa.; New England Drawn Steel Co. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to Massfield, Mass., f.o.b. Massfield; Empire Finished Steel Corp. on allocation outside New England.

Buffalo c.f. base plus c/l freight Buffalo to plants f.o.b. plant; Compressed Steel Shafting Co. on allocation outside New England, Buffalo base plus c/l freight Buffalo to Readville, Mass. f.o.b. Readville; Medart Co. in certain areas, Chicago c.f. base plus c/l freight Chicago to St. Louis, f.o.b. St. Louis.

Alloy Bars—Texas Steel Co. for delivery except Texas and Okla. Chicago base, f.o.b. Fort Worth, Tex.; Connors Steel Co. shipped outside Ala., Mississippi, Louisiana, Georgia, Florida, Tenn., Pittsburgh base, f.o.b. Birmingham.

Hot Rolled Strip—Joslyn Mfg. & Supply Co. \$2.30 Chicago; Knoxville Iron Co. \$2.25 basing pts.

Hot Rolled Sheets—Andrews Steel Co., Middletown base on shipments to Detroit or area; Parkersburg Iron & Steel Co., \$2.25 Parkersburg.

Galvanized Sheets—Andrews Steel Co., \$3.75 basing pts.; Parkersburg Iron & Steel Co. \$3.35 Parkersburg; Apollo Steel Co. \$3.75 basing pts.; Continental Steel Co., Middletown base on Kokomo, Ind., product; Superior Sheet Steel Co., Pittsburgh base except for Lend-Lease.

Pipe and Tubing—South Chester Tube Co. when priced at Pittsburgh, freight to Gulf Coast and Pacific Ports may be charged from Chester, Pa., also to points lying west of Harrisburg, Pa.
Black Sheets—Empire Sheet and Tinplate Co., maximum base price mill is \$2.45 per 100 lb., with differentials, transportation charges, etc., provided in RPS. No. 6.

PRICES

WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendments to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates 1/4 in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 8617-20	Hot Rolled, NE 9442-45 Ann.	Cold Drawn, NE 8617-20	Cold Drawn, NE 9442-45 Ann.
**Philadelphia	3.518	4.872 ^a	5.018a	3.922	4.772	3.605	3.666	3.822	4.072	5.966	7.066	7.272	8.322
New York	3.590	4.613 ^a	5.010	3.974 ^a	4.772	3.768	3.758	3.853	4.103	6.008	7.108	7.303	8.353
Boston	3.744	4.744 ^a	5.224 ^a	4.106	4.715	3.912	3.912	4.044	4.144	6.162	7.262	7.344	8.394
Baltimore	3.394	4.852	4.894	3.902	4.752	3.594	3.759	3.802	4.052				
Norfolk	3.771	4.965	5.371	4.165	4.865	3.971	4.002	4.065	4.165				
Chicago	3.25	4.20	5.231	3.60	4.651 ⁷	3.55	3.55	3.50	3.75	5.75	6.85	6.85	7.90
Milwaukee	3.387	4.337 ^a	5.272 ^a	3.737	4.787 ¹⁷	3.687	3.687	3.637	3.887	5.987	7.087	7.087	8.137
Cleveland	3.35	4.40	4.877 ^a	3.60	4.45	3.40	3.588	3.35	3.75	5.958	7.058	6.85	7.90
Buffalo	3.35	4.40	4.75 ^a	3.819	4.689	3.63	3.40	3.35	3.75	5.75	6.85	6.85	7.90
Detroit	3.45	4.50	5.00 ^a	3.70	4.659 ¹⁷	3.609	3.661	3.45	3.80	6.08	7.18	7.159	8.209
Cincinnati	3.425	4.475 ^a	4.825 ^a	3.675	4.711	3.611	3.691	3.611	4.011				
St. Louis	3.397	4.347 ^a	5.172 ^a	3.747	4.931 ¹⁷	3.697	3.697	3.647	4.031	6.131	7.231	7.231	8.281
Pittsburgh	3.35	4.40	4.75	3.60	4.45	3.40	3.40	3.35	3.75	5.75	6.85	6.85	7.90
St. Paul	3.51	4.46	5.257 ^a	3.86	4.351 ⁷	3.811 ³	3.811 ³	3.761 ³	4.361	6.09	7.19	7.561	8.711
Omaha	3.865	5.443	5.608 ^a	4.215	4.165	4.165	4.115	4.43					
Indianapolis	3.58	3.58	4.568	4.918	3.768	4.78	3.63	3.58	3.98	6.08	7.18	7.18	8.23
Birmingham	3.45		4.75	3.70		3.55	2.55	3.50	4.43				
Memphis	3.965 ⁷	4.68	3.265	4.215		4.065	4.065	4.015	4.33				
New Orleans	4.058 ^a	4.95	5.358	4.308		4.158	4.158 ^a	4.108 ^a	4.629				
Houston	3.763	5.573	6.313 ¹	4.313		4.25	4.25	3.75	6.373 ³	7.223	8.323	8.323	9.373
Los Angeles	5.00	7.20 ³	6.10 ^a	4.95	5.613 ¹⁶	4.95	4.65	4.40	5.583	8.304	9.404	9.404	10.454
San Francisco	4.551 ⁴	7.30 ⁴	6.35 ^a	4.501 ⁴	7.333 ¹⁷	4.651 ⁴	4.351 ⁴	4.151 ⁴	5.333	8.304	9.404	9.404	10.454
Seattle	4.651 ²	7.05 ⁴	5.95 ^a	4.251 ²		4.751 ²	4.451 ²	4.351 ²	5.783		9.404		
Portland	4.651 ¹¹	6.90 ⁴	5.75 ^a	4.751 ¹¹		4.751 ¹¹	4.451 ¹¹	4.451 ¹¹	5.533	8.304	9.404	8.304	9.404
Salt Lake City	4.531 ⁷		6.171 ⁸	5.531 ⁷		4.981 ⁷	4.981 ⁷	4.881 ⁷	5.90				

NATIONAL EMERGENCY (N. E.) STEELS (Hot Rolled Mill Extras for Alloy Content)

Designa- tion	CHEMICAL COMPOSITION LIMITS, PER CENT							Basic Open-Hearth		Electric Furnace			
	Carbon	Man- ganese	Phos- phorus Max.	Sul- phur Max.	Silicon	Chro- mium	Nickel	Molyb- denum	Bars and Strip	Billets, Blooms and Slabs	Bars and Strip	Billets, Blooms and Slabs	
NE 1330	.28/.33	1.60/1.90	.040	.040	.20/.35				.10c	\$2.00			
NE 1335	.33/.38	1.60/1.90	.040	.040	.20/.35				.10	2.00			
NE 1340	.38/.43	1.60/1.90	.040	.040	.20/.35				.10	2.00			
NE 1345	.43/.48	1.60/1.90	.040	.040	.20/.35				.10	2.00			
NE 1350	.48/.53	1.60/1.90	.040	.040	.20/.35				.10	2.00			
NE 8613	.12/.17	.70/.90	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	\$25.00	
NE 8615	.13/.18	.70/.90	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00	
NE 8617	.15/.20	.70/.90	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00	
NE 8620	.18/.23	.70/.90	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00	
NE 8630	.28/.33	.70/.90	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00	
NE 8635	.33/.38	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00	
NE 8637	.35/.40	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00	
NE 8640	.38/.43	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00	
NE 8642	.40/.45	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00	
NE 8645	.43/.48	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00	
NE 8650	.48/.53	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.70	.15/.25	.75	15.00	1.25	25.00	
NE 8720	.18/.23	.70/.90	.040	.040	.20/.35	.40/.60	.40/.70	.20/.30	.80	16.00	1.30	26.00	
NE 9255	.50/.60	.70/.95	.040	.040	1.80/2.20				.40	8.00			
NE 9260	.55/.65	.70/1.00	.040	.040	1.80/2.20				.40	8.00			
NE 9261	.55/.65	.70/1.00	.040	.040	1.80/2.20	.10/.25			.65	13.00			
NE 9262	.55/.65	.70/1.00	.040	.040	1.80/2.20	.25/.40			.65	13.00			
NE 9415	.13/.18	.80/1.10	.040	.040	.20/.35	.30/.50	.30/.60	.08/.15	.75	15.00	1.25	25.00	
NE 9420	.18/.23	.80/1.10	.040	.040	.20/.35	.30/.50	.30/.60	.08/.15	.75	15.00	1.25	25.00	
NE 9422	.20/.25	.80/1.10	.040	.040	.20/.35	.30/.50	.30/.60	.08/.15	.75	15.00	1.25	25.00	
NE 9425	.23/.28	.80/1.10	.040	.040	.20/.35	.30/.50	.30/.60	.08/.15	.75	15.00	1.25	25.00	
NE 9430	.28/.33	.90/1.20	.040	.040	.20/.35	.30/.50	.30/.60	.08/.15	.75	15.00	1.25	25.00	
NE 9435	.33/.38	.90/1.20	.040	.040	.20/.35	.30/.50	.30/.60	.08/.15	.75	15.00	1.25	25.00	
NE 9437	.35/.40	.90/1.20	.040	.040	.20/.35	.30/.50	.30/.60	.08/.15	.75	15.00	1.25	25.00	
NE 9449	.38/.43	.90/1.20	.040	.040	.20/.35	.30/.50	.30/.60	.08/.15	.75	15.00	1.25	25.00	
NE 9442	.40/.45	1.00/1.30	.040	.040	.20/.35	.30/.50	.30/.60	.08/.15	.80	16.00	1.30	26.00	
NE 9445	.43/.48	1.00/1.30	.040	.040	.20/.35	.30/.50	.30/.60	.08/.15	.80	16.00	1.30	26.00	
NE 9450	.48/.53	1.20/1.50	.040	.040	.20/.35	.30/.50	.30/.60	.08/.15	.80	16.00	1.30	26.00	
NE 9537 ^a	.35/.40	1.20/1.50	.040	.040	.40/.60	.40/.60	.40/.70	.15/.25	1.20	24.00	1.70	34.00	
NE 9540 ^a	.38/.43	1.20/1.50	.040	.040	.40/.60	.40/.60	.40/.70	.15/.25	1.20	24.00	1.70	34.00	
NE 9542 ^a	.40/.45	1.20/1.50	.040	.040	.40/.60	.40/.60	.40/.70	.15/.25	1.20	24.00	1.70	34.00	
NE 9545 ^a	.43/.48	1.20/1.50	.040	.040	.40/.60	.40/.60	.40/.70	.15/.25	1.20	24.00	1.70	34.00	
NE 9550 ^a	.48/.53	1.20/1.50	.040	.040	.40/.60	.40/.60	.40/.70	.15/.25	1.20	24.00	1.70	34.00	

^aRecommended for large sections only. Note: The extras shown are in addition to a base price of 2.70c. per 100 lb., on finished products and \$54 per gross ton on semi-finished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semi-finished. When acid open-hearth is specified and acceptable add to basic open hearth alloy differential 0.25c. per lb. for bars and bar strip, \$5.00 per gross ton for billets, blooms and slabs. The ranges shown above are restricted to sizes 100 sq. in. or less or equivalent cross sectional area 18 in. wide or under with a max. individual piece weight of 7000 lb.

Base Quantities

Standard unless otherwise keyed on prices.

HOT ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD ROLLED: Sheets, 400 to 1499 lb.; strip, extras on all quantities; bars, 1500 lb. base; NE alloy bars, 1000 to 39,999 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 1999 lb. (7) 400 to 1999 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb. and over. (15) 1000 lb. and over. (16) 1500 lb. and over. (17) 2000 lb. and over. (18) 3500 lb. and over. (19) Philadelphia: Galvanized sheets, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

*Add 0.271c. for sizes not rolled in Birmingham.

**City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports*)

Per Gross Ton
Old range, bessemer, 51.50 \$4.75
Old range, non-bessemer, 51.50 4.60
Mesaba, bessemer, 51.50 4.60
Mesaba, non-bessemer, 51.50 4.45
High phosphorus, 51.50 4.35

*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

FLUORSPAR

Maximum price f.o.b. consumer's plant, \$30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Exception

When the WPB Steel Division certifies in writing the consumer's need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Base price per short ton
Effective CaF₂ Content: 70% or more \$32.00
65% but less than 70% 32.00
60% but less than 65% 31.00
Less than 60% 30.00

PRICES

SEMI-FINISHED STEEL

Ingots, Carbon, Re-rolling

Base per gross ton, f.o.b. mill.... \$31.00
Exceptions: Phoenix Iron Co. may charge \$38.75; Kaiser Co., \$43.00 f.o.b. Pacific Coast Ports; Empire Sheet & Tinplate Co., \$34.25.

Ingots, Carbon, Forging

Base per gross ton, f.o.b. Birmingham, Buffalo, Chicago, Cleveland, Gary, Pittsburgh, Youngstown..... \$36.00
Exceptions: Phoenix Iron Co. may charge \$43.00; Empire Sheet & Tinplate Co., \$39.25, f.o.b. Mansfield, Ohio; West Coast producers, \$48.00, f.o.b. Pacific Coast Ports.

Ingots, Alloy

Base per gross ton, f.o.b. Bethlehem, Buffalo, Canton, Coatesville, Chicago, Massillon, Pittsburgh..... \$45.00
Exceptions: C/L delivered Detroit add \$2.00; delivered East Michigan add \$3.00. Connors Steel Co. may charge \$45.00 f.o.b. Birmingham.

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (re-rolling only). Prices delivered Detroit are \$2.00 higher; delivered E. Michigan, \$3 higher; f.o.b. Duluth, billets only, \$2.00 higher; billets f.o.b. Pacific ports are \$12 higher. Delivered prices do not reflect three per cent tax on freight rates.

Per Gross Ton

Re-rolling..... \$34.00
 Forging quality..... 40.00
 For exceptions on semi-finished steel see the footnote on the page of finished steel prices.

Alloy Billets, Blooms, Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton..... 54.00
 Price delivered Detroit \$2.00 higher; E. Michigan \$3.00 higher.

Shell Steel

Per Gross Ton

8 in. to 12 in..... \$52.00
 12 in. to 18 in..... 54.00
 18 in. and over..... 56.00
 Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.
 Prices delivered Detroit are \$2.00 higher; E. Michigan, \$3 higher.
 Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point.

Per Gross Ton

Open hearth or bessemer..... \$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared... 1.90c.

Wire Rods

(No. 5 to 9/32 in.)

Per Lb.

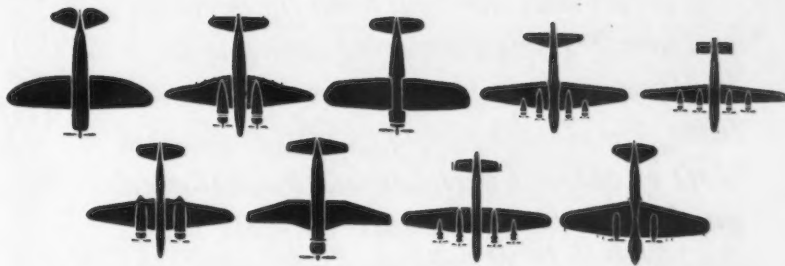
Pittsburgh, Chicago, Cleveland... 2.00c.
 Worcester, Mass..... 2.10c.
 Birmingham..... 2.00c.
 San Francisco..... 2.50c.
 Galveston..... 2.25c.
 9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)
 Base per lb.

High speed..... 67c.
 Straight molybdenum..... 54c.
 Tungsten-molybdenum..... 57 1/2c.
 High-carbon-chromium..... 43c.
 Oil hardening..... 24c.
 Special carbon..... 22c.
 Extra carbon..... 18c.
 Regular carbon..... 14c.
 Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi 1c. higher.

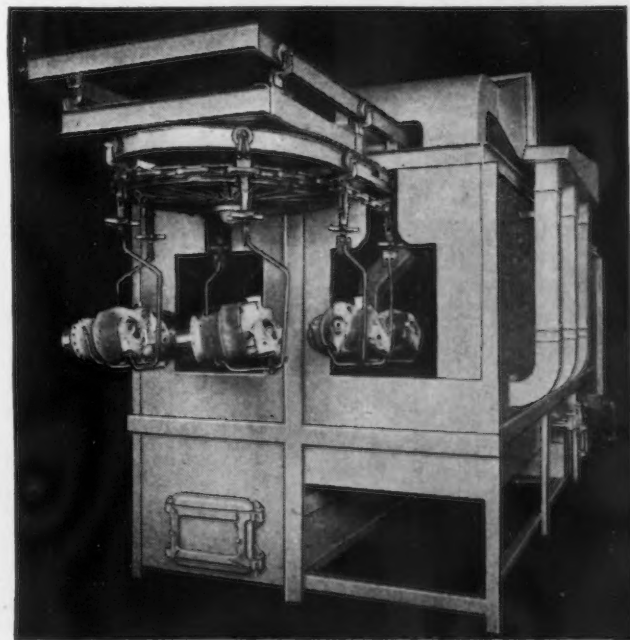
Can YOU Identify These Planes?



NO LONGER regarded as a necessary nuisance, the cleaning and finishing of metal parts and products has become an integral part of the production routine of practically every airplane engine manufacturer.

Many have come to Alvey-Ferguson for custom-built A-F Cleaning and Finishing Equipment to perform specialized cleaning and finishing functions for quality control which could not be performed by regular standard equipment.

Whatever you manufacture, you can probably clean it better, more *efficiently* and at lower cost over a period of time with A-F Equipment. Write us about it—today.



FIRST in the field of package handling since 1901, and specialists in the application of materials and products handling as well as metal products cleaning and finishing, A-F Engineers have now timed the cleaning of airplane engine parts with the precision machining operation.



Incidentally, the above planes are: Republic P-47 Thunderbolt... Vega B-34 Ventura... Voight F-40 Corsair... Boeing B-17 Flying Fortress... Consolidated B-24 Liberator... Martin A-30 Baltimore... Vultee A-31 Vengeance... Avro Lancaster 1 (Br.)... Ilyuchin 2 Stormovik (Russian). Courtesy Aviation.

THE ALVEY-FERGUSON COMPANY

711 DISNEY STREET

Offices in Principal Cities

CINCINNATI 9, OHIO

Affiliated Corporations:

The Alvey-Ferguson Co. of California, P. O. Box 396, Vernon Branch, Los Angeles 11, California

CONVEYING EQUIPMENT



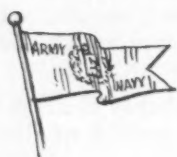
Alvey-Ferguson

METAL PRODUCTS CLEANING & FINISHING EQUIPMENT

"Plus or Minus..."

Those "tolerance" boys with the devilish micrometers sometimes want springs made to tight measurements...we just smile...and make them...but it adds plenty of "plus" to the cost. Lots of springs aren't so fussy...just good quality and easy tolerances...we make them, too...for less. We'll tackle your jobs—either kind—and try to give satisfaction because we want to be

"Everybody's Spring Dept."



DUNBAR

BROTHERS CO.

DIV. OF ASSOCIATED SPRING CORP.

BRISTOL, CONN.

SPRINGS • WIRE FORMS • SMALL STAMPINGS

C-F POSITIONERS



as far as the eye can see...

through the light haze of this gigantic welding department extend triple rows of C-F Positioners. From this almost endless production line (the photograph is taken from the half-way point) each day come heretofore unheard of numbers of fabrication with all seams, joints and unions strongly and smoothly welded "downhand".

There are no handling problems or delays, for on C-F Positioners each welder positions his weldment for succeeding welds with a pushbutton control—can rotate it at any desired speed (360°) or tilt it to any angle up to 135° beyond horizontal.

Write for Bulletin WP-22

Cullen-Friestedt Co.

1303 S. Kilbourn Ave.
Chicago 23, Ill.



PRICES

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe)
Base Price—\$2.00 per Net Ton

Steel (Butt Weld)

	Black	Gale.
1/2 in.	63 1/2	51
3/4 in.	66 1/2	55
1 to 3 in.	68 1/2	57 1/2

Wrought Iron (Butt Weld)

1/2 in.	24	3 1/2
3/4 in.	30	10
1 and 1 1/4 in.	34	16
1 1/2 in.	38	18 1/2
2 in.	37 1/2	18

Steel (Lap Weld)

2 in.	61	49 1/2
2 1/2 and 3 in.	64	52 1/2
3 1/2 to 6 in.	66	54 1/2

Wrought Iron (Lap Weld)

2 in.	30 1/2	12
2 1/2 to 3 1/2 in.	31 1/2	14 1/2
4 in.	33 1/2	18
4 1/2 to 8 in.	32 1/2	17

Steel (Butt, extra strong, plain ends)

1/2 in.	61 1/2	50 1/2
3/4 in.	65 1/2	54 1/2
1 to 3 in.	67	57

Wrought Iron (Same as Above)

1/2 in.	25	6
3/4 in.	31	12
1 to 2 in.	38	19 1/2

Steel (Lap, extra strong, plain ends)

2 in.	59	48 1/2
2 1/2 and 3 in.	63	52 1/2
3 1/2 to 6 in.	66 1/2	56

Wrought Iron (Same as Above)

2 in.	33 1/2	15 1/2
2 1/2 to 4 in.	39	22 1/2
4 1/2 to 6 in.	37 1/2	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card. F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld.

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago...	\$54.80
6-in. and larger, del'd New York...	52.20
6-in. and larger, Birmingham...	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles...	69.40
6-in. and larger f.o.b. cars, Seattle...	71.20
Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger are \$45 at Birmingham and \$53.80 delivered Chicago, \$59.40 at San Francisco and Los Angeles, and \$70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates.	

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes, Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.

	Seamless	Lap Weld
	Cold	Hot
	Drawn	Hot Rolled
2 in. o.d. 13 B.W.G. 15.03	13.04	12.38
2 1/2 in. o.d. 12 B.W.G. 20.21	17.54	16.58
3 in. o.d. 12 B.W.G. 22.48	19.50	18.38
3 1/2 in. o.d. 11 B.W.G. 28.37	24.62	23.16
4 in. o.d. 10 B.W.G. 35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. and over.....	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

PRICES

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	Pacific Coast Basing Points†
	Base per Keg	
Standard wire nails.....	\$2.55	\$3.05
Coated nails	2.55	3.05
Cut nails, carloads	3.85	...
	Base per 100 lb.	
Annealed fence wire	\$3.05	\$3.55
Annealed galv. fence wire	3.40	3.90
	Base Column	
Woven wire fence*	\$0.67	\$0.85
Fence posts, carloads ..	.69	.86
Single loop bale ties ...	.59	.84
Galvanized barbed wire**	.70	.80
Twisted barless wire ...	.70	...

*15½ gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:

Base discount less case lots

	Per Cent Off List
½ in. & smaller x 6 in. & shorter...	65½
¾/16 & ½ in. x 6 in. & shorter....	63½
¾ to 1 in. x 6 in. & shorter	61
1½ in. and larger, all lengths	59
All diameters over 6 in. long.....	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:

(Hexagon or Square)

½ in. and smaller	62
¾/16 to 1 in. inclusive	59
1½ to 1½ in. inclusive	57
1½ in. and larger	56
On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.	

Semi-Fin. Hexagon Nuts U.S.S. S.A.E.

Base discount less keg lots

7/16 in. and smaller	64
¾ in. and smaller	62
¾ in. through 1 in.	60
¾/16 in. to 1 in.	59
1½ in. through 1½ in.	57
1½ in. and larger	56
In full keg lots, 10 per cent additional discount.	

Stove Bolts

Consumer

Packages, nuts loose	71 and 10
In packages, with nuts attached	71
In bulk	80
On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland Chicago, New York on lots of 200 lb. or over.	

Large Rivets

(¾ in. and larger)

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$3.75
---	--------

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland Chicago, Birmingham	65 and 5
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Cap and Set Screws

Consumer

Per Cent Off List

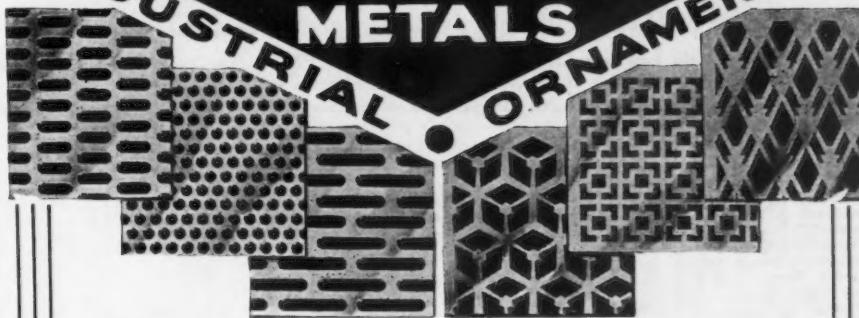
Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes....	36
Fillister head cap, listed sizes	51
Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.	

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C. ...	\$6.00	\$12.00
15-lb. coating I.C. ...	7.00	14.00
20-lb. coating I.C. ...	7.50	15.00

PERFORATED METALS



ANY METAL • ANY PERFORATION

Industrial—Well balanced screens of excellent material and workmanship to assure maximum screen production combined with durability.

Ornamental—Approved patterns and finishes including many exclusive and characteristic designs for grilles and furniture. We invite your inquiries.

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PERFORATING CO.

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Eastern Office, 114 Liberty Street, New York 6, N. Y.

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General Purpose
Dredging and Hard Digging
Dragline
Material Handlers
Hook-on Type
Ore Handling
Coal and Coke
4-Rope
Barge Type
Strayer Electric

THE COMPLETE LINE

Write for Data

Above types built in weights and capacities to suit your crane and job requirements.

ERIE STEEL CONSTRUCTION CO.

ERIE, PENNSYLVANIA

Aggre Meters • Buckets • Concrete Plants • Traveling Cranes

PRICES

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima. Delivered prices do not reflect 3 per cent tax on freight rates.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos- phorus	Charcoal
Boston.....	\$25.50	\$25.00	\$26.50	\$26.00	.....	.....
Brooklyn.....	27.50	27.00	27.53	28.00	.....	.....
Jersey City.....	26.53	26.03	26.53	27.03	.....	.....
Philadelphia (4).....	25.84	25.34	26.84	26.34	\$30.74	.....
Bethlehem, Pa.....	25.00	24.50	26.00	25.50	.....	.....
Everett, Mass.....	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.....	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.....	25.00	24.50	26.00	25.50	29.50	.....
Birdsboro, Pa. (3).....	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.....	24.00	23.50	25.00	24.50	.....	.....
Erie, Pa.....	24.00	23.50	24.50	24.00	.....	.....
Neville Island, Pa.....	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa. (1).....	24.00	23.50	24.50	24.00	.....	.....
Buffalo.....	24.00	23.50	25.00	24.50	29.50	.....
Cincinnati, Ohio.....	25.11	24.61	.....	25.11	.....	.....
Canton, Ohio.....	25.39	24.89	25.89	26.39	32.69	.....
Manfield, Ohio.....	25.94	25.44	26.44	25.94	32.86	.....
St. Louis.....	24.50	24.50	.....	.....	.....	.....
Chicago.....	24.00	23.50	24.50	24.00	35.46	\$37.34
Granite City, Ill.....	24.00	23.50	24.50	24.00	.....	.....
Cleveland.....	24.00	23.50	24.50	24.00	32.42	.....
Hamilton, Ohio.....	24.00	23.50	24.50	24.00	.....	.....
Toledo.....	24.00	23.50	24.50	24.00	.....	.....
Youngstown.....	24.00	23.50	24.50	24.00	32.42	.....
Detroit.....	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fc.....	.....	.....	.....	.....	34.00	33.00
Lykes, Tenn. fc. (2).....	.....	26.13	27.13	26.63	39.80	.....
St. Paul.....	26.63	26.13	.....	26.63	.....	.....
Duluth.....	24.50	24.00	25.00	24.50	.....	.....
Birmingham.....	20.38	19.00	25.00	.....	.....	.....
Los Angeles.....	26.95	.....	.....	.....	.....	.....
San Francisco.....	26.95	.....	.....	.....	.....	.....
Seattle.....	26.95	.....	.....	.....	.....	.....
Provo, Utah.....	22.00	21.50	.....	.....	.....	.....
Montreal.....	27.50	27.50	.....	28.00	.....	.....
Toronto.....	25.50	25.50	.....	26.00	.....	.....

GRAY FORGE IRON: Valley or Pittsburgh furnace **\$23.50**

(1) Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable. Struthers Iron and Steel Co. may add another \$1.00 per gross ton for iron from Struthers, Ohio, plant.

(2) Price shown is for low-phosphorous iron; high phosphorous sells for \$28.50 at the furnace.

(3) E. & G. Brooke Co. Birdsboro, Pa., permitted to charge \$1.00 per ton extra.

(4) Pittsburgh Ferromanganese Co. (Chester furnace only) may charge \$2.25 a ton over maximum basing point prices.

Basing point prices are subject to switching charges; Silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 to 2.25 per cent); Phosphorus differentials, a reduction of 38c. per ton for phosphorus content of 0.70 per cent and over; Manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, \$2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and \$1 per ton extra for each additional 0.25 per cent nickel.

METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, c. per lb., ton lots.

Copper, electrolytic, 150 and 200 mesh 21½ to 23¼c.

Copper, reduced, 150 and 200 mesh 20½ to 25¼c.

Iron, commercial, 100 and 200 mesh, 96 + % Fe. 13½ to 15c.

Iron, crushed, 200 mesh and finer, 90 + % Fe. 4c.

Iron, hydrogen reduced, 300 mesh and finer, 98½ + % Fe. 63c.

Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe. 30 to 33c.

Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe. 42c.

Iron, carbonyl, 300 mesh and finer, 98-99.8 + % Fe. 90c.

Aluminum, 100 and 200 mesh. *23 to 27c.

Antimony, 100 mesh 20.6c.

Cadmium, 100 mesh \$1

Chromium, 150 mesh \$1.03

Lead, 100, 200 & 300 mesh, 11½ to 12½c.

Manganese, 150 mesh 51c.

Nickel, 150 mesh 51½c.

Solder powder, 100 mesh, 8½c. plus metal

Tin, 100 mesh 58½c.

Tungsten metal powder, 98%-99%, any quantity, per lb. \$2.60

Molybdenum powder, 99%, in 200-lb. kegs. f.o.b. York, Pa., per lb. \$2.60

Under 100 lb. \$3.00

*Freight allowed east of Mississippi.

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	\$7.00*
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	8.25
Foundry, By-Product	
Chicago, del'd	13.35
Chicago, f.o.b.	12.60
New England, del'd	14.25
Kearny, N. J., f.o.b.	12.65
Philadelphia, del'd	12.88
Buffalo, del'd	13.00
Portsmouth, Ohio, f.o.b.	11.10
Painesville, Ohio, f.o.b.	11.75
Erie, del'd	12.75
Cleveland, del'd	12.80
Cincinnati, del'd	12.85
St. Louis, del'd	13.85
Birmingham, del'd	10.50

*Hand drawn ovens using trucked coal permitted to charge \$7.75 per ton plus transportation charges. **Mo., Ala., and Tenn. producers—\$13.35.



JOHNSON XLO

Music Wire

Wire of a thousand uses. Drawn under strict laboratory control all the way from original steel to finished product. When you specify Johnson XLO Music Wire you are certain of a high quality product in on every coil of wire.

Note coil spring that comes to you every respect.

Stock sizes .003" to .200" dia.
In coils or packages.

JOHNSON STEEL & WIRE CO., INC.

WORCESTER 1, MASSACHUSETTS.

NEW YORK ATLANTA AKRON CHICAGO LOS ANGELES

PRICES

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick		Per 1000
Super-duty brick, St. Louis		\$64.60
First quality, Pa., Md., Ky., Mo., Ill.		51.30
First quality, New Jersey		56.00
Sec. quality, Pa., Md., Ky., Mo., Ill.		46.55
Second quality, New Jersey		51.00
No. 1, Ohio		43.00
Ground fire clay, net ton		7.60

Silica Brick

Pennsylvania and Birmingham	\$51.30
Chicago District	58.90
Silica cement, net ton (Eastern)	9.00

Chrome Brick

Standard chemically bonded, Balt., Plymouth Meeting, Chester		Per Net Ton
		\$54.00

Magnesite Brick

Standard, Balt. and Chester	\$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester	
In sacks (carloads)	\$43.48
Domestic, f.o.b. Chewelah, Wash.	
(In bulk)	22.00

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., No. 1 O.H., gross ton	\$40.00
Angle splice bars, 100 lb.	2.70
(F.o.b. Basing Points)	Per Gross Ton
Light rails (from billets)	\$40.00
Light rails (from rail steel)	39.00

Base per Lb.

Cut spikes	3.00c.
Screw spikes	5.15c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts	4.75c.
Track bolts, heat treated, to rail-roads	5.00c.
Track bolts, jobbers discount	63-5
Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo, Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25c.	

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hot strip	17.00c.	17.50c.	24.00c.	35.00c.
Cold strip	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.
F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo, Pacific ports add 75c. per 100 lb. on all grades.	

FOR ALL TYPES of INDUSTRIAL FURNACES



P-811

Oil Burners for CRANES and LOCOMOTIVES

The Type SA, Model G Fuel Oil Burner, designed for firing Yard Locomotives, Cranes, Hoists, and similar applications, is the choice of numerous Steel Mills. It has in it all the outstanding features that have made our Standard Type SA Oil Burner (shown below) preferred for a wide variety of uses for over 32 years.

The Locomotive Oil Burner works on a low head, gravity oil feed . . . gives complete atomization of cheapest grades of oil and tar with low steam consumption . . . requires little maintenance. For more details write us.



Cross Section of Type SA Oil Burner

NATIONAL AIROIL BURNER COMPANY, INCORPORATED

1271 East Sedgley Ave., Philadelphia 34, Pa.
ESTABLISHED 1912 INCORPORATED 1917

NATIONAL AIROIL
FUEL OIL - GAS
BURNERS

Steam Atomizing Oil Burners—Mechanical Pressure Atomizing Oil Burners—Low Air Pressure Oil Burners—Motor-driven Rotary Oil Burners—Industrial Gas Burners—Combination Gas and Oil Burners—Fuel Oil Pumping Units—Fuel Oil Heaters—Fuel Oil Strainers and other accessories.



You Can Depend On "Hercules" (Red Strand) Wire Rope

Highlights of Quality

1. Acid Open-Hearth Steel Wire
2. Rigid Tests and Inspections
3. Correct Manufacturing Methods
4. Furnished in both the Round and Flattened Strand constructions, in either Standard or Preformed Type.

• • Results are what count, and the performance record of this wire rope continues to make and hold friends.

There is no guess work when you use "HERCULES" (Red-Strand) Wire Rope. It is designed and built to do specific jobs better . . . safer . . . more economically. If you will tell us how you use wire rope, we shall be glad to suggest the construction and type most suitable for your conditions.

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BRONZE BEARINGS

OILLESS BRONZE BEARINGS

GEAR BLANKS

MACHINED BRONZE PARTS

S & H Bronze Bearings can be furnished in any size or quantity to meet your particular requirements.

Our equipment and manufacturing methods enable us to meet the most exacting specifications and design.



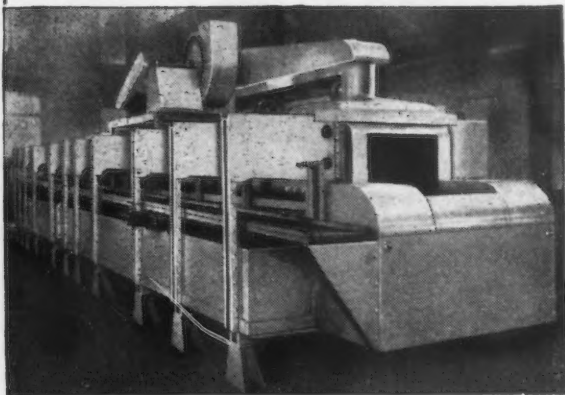
INDUSTRIAL

BEARINGS

S. & H. Bearing and Manufacturing Co., Inc.

340-344 North Avenue, East
Cranford New Jersey

RANSOHOFF EQUIPMENT For The Surface Treatment Of Metals



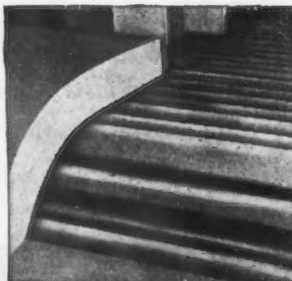
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ALUMINUM
FORGINGS
as they come
from the dies

QUICKER
BETTER
CHEAPER

Aluminum forgings emerge as clean as a silver dollar . . . ready for your processing. Another cesspool and health hazard are eliminated. Aluminum forgings previously were dipped in successive open tanks containing 20% hot caustic, rinse, 10% cold nitric acid and final rinse. The RANSOHOFF machine illustrated handles the complete operation on a specially constructed conveyor belt (see small illustration). Parts are drenched at low pressure with a RANSOHOFF special pump (no stuffing boxes).

Write for details. Send us a sample batch.

N. RANSOHOFF, Inc. 1315 Township Ave.
CINCINNATI, O.



PRICES

Ferromanganese

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Bethlehem, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.
Carload lots (bulk) \$135.00
Carload lots (packed) 141.00
Less ton lots (packed) 148.50
Premium, \$1.70 for each 1% above 82% Mn; penalty, \$1.70 for each 1% below 78%.

Manganese Metal

Contract basis, lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Spot sales add 2c. per lb.
96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe.
Carload, bulk 36c.
L.c.l. lots 38c.
95-97% Mn, .2% max. C, 1.5% max. Si, 2.5% max. Fe.
Carload, bulk 34c.
L.c.l. lots 35c.

Spiegeleisen

Maximum base, contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.
16-19% Mn 19-21% Mn
3% max. Si 3% max. Si
Carloads \$35.00 \$36.00
Less ton 47.50 48.50

Electric Ferrosilicon

OPA maximum base price cents per lb. contained Si, lump size in carlots, f.o.b. shipping point with freight allowed to destination.

	Eastern Zone	Central Zone	Western Zone
50% Si	6.65c.	7.10c.	7.25c.
75% Si	8.05c.	8.20c.	8.75c.
80-90% Si ..	8.90c.	9.05c.	9.55c.
90-95% Si ..	11.05c.	11.20c.	11.65c.
Spot sales add: .45c. per lb. for 50% Si, .3c. per lb. or 75% Si .25c. per lb. for 80-90% and 90-95% Si.			

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)
F.o.b. Jackson, Ohio \$29.50*
Buffalo 30.75*
For each additional 0.50% silicon add \$1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add \$1 a ton for 0.75% phosphorus or over.
*OPA price established 6-24-41.

Bessemer Ferrosilicon

Prices are \$1 a ton above silvery iron quotations of comparable analysis.

Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
96% Si, 2% Fe.	13.10c.	13.55c.	16.50c.
97% Si, 1% Fe.	13.45c.	13.90c.	16.80c.

Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk 3.35c.	3.50c.	3.65c.	
2000 lb.-carload 3.8c.	4.2c.	4.25c.	

Silicomanganese

Contract basis lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Add .25c. for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.
Carload, bulk 6.05c.
2000 lb. to carload 6.90c.
Under 2000 lb. 6.90c.
Briquets, contract, basis carlots, bulk freight allowed, per lb.... 5.80c.
2000 lb. to carload 6.30c.
Less ton lots 6.55c.

Ferrochrome

(65-72% Cr, 2% max. Si)
OPA maximum base contract prices per lb. of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add .25c. per lb. contained Cr for spot sales.

	Eastern Zone	Central Zone	Western Zone
0.06% C 23.00c.	23.40c.	24.00c.	
0.10% C 22.50c.	22.90c.	23.50c.	
0.15% C 22.00c.	22.40c.	23.00c.	
0.20% C 21.50c.	21.90c.	22.50c.	
0.50% C 21.00c.	21.40c.	22.00c.	
1.00% C 20.50c.	20.90c.	21.50c.	
2.00% C 19.50c.	19.90c.	21.00c.	
66-71% Cr, 4-10% C	13.00c.	13.40c.	14.00c.

PRICES

Other Ferroalloys

Ferrotungsten, Standard grade, lump or 1/4 X down, packed, f.o.b. plant at Niagara Falls, New York, Washington, Pa., York, Pa., per lb. contained tungsten, 10,000 lb. or more...	\$1.90
Ferrovandium, 35-55%, contract basis, f.o.b. producer's plant, usual freight allowances, per usual freight allowances, per lb. contained Va.	
Open Hearth	\$2.70
Crucible	\$2.80
Primos	\$2.90
Cobalt, 97% min., keg packed, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. of cobalt metal	\$1.50
Vanadium pentoxide, 88%-92% V ₂ O ₅ technical grade, contract basis, any quantity, per lb. contained V ₂ O ₅ . Spot sales add 5c. per lb. contained V ₂ O ₅	\$1.10
Ferroboron, contract basis, 17.50% min. Bo, f.o.b. producer's plant with usual freight allowances, per lb. of alloy	
2000 lb. to carload	\$1.20
Under 2000 lb.	1.30
Silicaz No. 3, contract basis, f.o.b. producer's plant with usual freight allowances, per lb. of alloy. (Pending OPA approval)	
Carload lots	25c.
2000 lb. to carload	26c.
Silvaz No. 3, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy (Pending OPA approval)	
Carload lots	58c.
2000 lb. to carload	59c.
Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb. and over, max. based on rate to St. Louis	
No. 1	87.5c.
No. 6	60c.
No. 79	45c.
Bortram, f.o.b. Niagara Falls	
Ton lots, per lb.	45c.
Less ton lots, per lb.	50c.
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per lb. contained Cb.	
2000 lb. lots	\$2.25
Under 2000 lb. lots	\$2.30
Ferrotitanium, 40%-45%, f.o.b. 0.10c. max. Niagara Falls, N. Y., ton lots, per lb. contained Ti.	\$1.23
Less ton lots	\$1.25
Ferrotitanium, 20%-25%, 0.10 C max., ton lots, per lb. contained titanium	\$1.35
Less ton lots	\$1.40
High-carbon ferrotitanium, 15%-20%, 6%-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y., freight allowed East of Mississippi River, North of Baltimore and St. Louis, per carload	\$142.50
Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with \$3 unitage freight equalized with Rockdale, Tenn., per gross ton	\$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage freight equalized with Nashville, per gross ton	\$75.00
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., any quantity, per lb. contained Mo.	95c.
Calcium molybdate, 40%-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained Mo.	80c.
Molybdenum oxide briquettes, 48%-52% Mo, f.o.b. Yangeloth, Pa., per lb. contained Mo.	80c.
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per lb. contained Mo.	80c.
Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy. Add 1/4c. for spot sales	
Carload lots	14c.
Zirconium, 12-15%, contract basis, lump, f.o.b. plant usual freight allowances, per lb. of alloy	
Carload, bulk	4.6c.
Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk	5.75c.
Ton lots	7.25c.
Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per lb.	
Car lots	8.75c.
Ton lots	9.25c.

A.I.S.I. HY-TEN S.A.E. N.E.

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